# Construction Roadway Closures, Restrictions, and Detours

*Timeline Assumes Full Project Funding*

2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017

STAGE ONE | STAGE TWO | STAGE THREE | STAGE FOUR | STAGE FIVE | STAGE SIX | FINAL STAGE

## Shorter Construction Plan

**Tunnel**

**Tunnel – 30 months**
- Traffic remains on SR 99
- Alaskan Way reduced to 1 lane in each direction
- Remove parking under viaduct
- Remove Waterfront Streetcar and track

**Tunnel – 42 mos.**
- SR 99 closed from S. Spokane to Denny
- SR 99 north of Denny is reduced to 3 lanes total
- Alaskan Way restricted to local access

**Tunnel – 12 mos**
- SR 99 completed and open to traffic
- Alaskan Way periodically reduced to 1 lane in each direction

7 yrs

## Intermediate Construction Plan

**Tunnel**

**Stacked – 30 months**
- Traffic remains on SR 99
- Alaskan Way reduced to 1 lane in each direction
- Remove parking under viaduct
- Remove Waterfront Streetcar and track

**Stacked – 9 mos.**
- Traffic remains on SR 99
- Close Western off-ramp
- Alaskan Way restricted to local access

**Stacked – 15 mos.**
- Southbound SR 99 open from S. Spokane to Columbia, closed from Columbia to Denny
- Northbound SR 99 open from S. Spokane to Denny, Western ramp closed
- SR 99 north of Denny is reduced to 2 northbound lanes and 1 southbound lane
- Alaskan Way restricted to local access

**Stacked – 27 mos.**
- SR 99 closed to all traffic from S. Spokane to Denny
- SR 99 north of Denny is reduced to 1 northbound lane and 2 southbound lanes
- Alaskan Way restricted to local access

**Stacked – 12 mos.**
- Southbound SR 99 open to traffic in new tunnel
- Northbound SR 99 open from S. Spokane to S. King, closed from S. King to Denny, open north of Denny
- Alaskan Way restricted to local access

**Stacked –12 mos.**
- SR 99 completed and open to traffic
- Alaskan Way periodically reduced to 1 lane in each direction

8.75 yrs

## Longer Construction Plan

**Elevated Structure**

**Elevated Structure – 30 months**
- Traffic remains on SR 99
- Alaskan Way reduced to 1 lane in each direction
- Remove parking under viaduct
- Remove Waterfront Streetcar and track

**Elevated – 9 mos**
- Traffic remains on SR 99
- Close Western off ramp
- Alaskan Way reduced to 1 lane in each direction

**Elevated Structure – 27 mos.**
- SR 99 reduced to 2 lanes in each direction
- Southbound traffic routed to Broad Street Detour, viaduct, and First Avenue S. Detour
- Northbound traffic remains on SR 99
- Elliott and Western ramps closed
- SR 99 north of Denny reduced to 3 lanes total
- Alaskan Way reduced to 1 lane in each direction

**3 mos.**
- SR 99 closed
- SR 99 north of Denny is reduced to 1 northbound lane and 2 southbound lanes
- Alaskan Way reduced to 1 lane in each direction

**Elevated Structure – 24 mos.**
- SR 99 reduced to 2 lanes in each direction on lower viaduct deck
- Southbound traffic routed to Broad Street Detour
- Columbia, Seneca, Elliott, and Western ramps closed
- Alaskan Way reduced to 1 lane in each direction

**Elevated Structure – 21 mos.**
- SR 99 reduced to 2 lanes in each direction on upper viaduct deck
- Columbia and Elliott ramps closed
- Seneca and Western ramps open
- Alaskan Way reduced to 1 lane in each direction

**6 mos.**
- SR 99 completed open to traffic
- Alaskan Way periodically reduced to 1 lane in each direction

10 yrs

*BOTH ALTERNATIVES COULD BE BUILT UNDER ANY OF THE CONSTRUCTION PLANS.*

***Exhibit 7-1***

# CHAPTER 7 - CONSTRUCTION EFFECTS

## What's in Chapter 7?

*This chapter identifies construction effects and possible mitigation measures for the alternatives and the proposed construction plans. Construction effects without mitigation are discussed first; possible mitigation measures are identified in Questions 7, 23, and 24.*

*As a reminder, the construction plans specifically evaluated in this chapter are the tunnel with the shorter and intermediate plans and the elevated structure with the longer plan. However, as described in Chapter 6, the Tunnel and Elevated Structure Alternatives could be built under any of the three construction plans.*

### 1 How would traffic on SR 99 and Alaskan Way be restricted during construction?

Exhibit 7-1 shows proposed SR 99 roadway closures, restrictions, and detours for the Tunnel and Elevated Structure Alternatives during construction. Durations of roadway closures and restrictions vary depending on the alternative and construction plan selected. As shown in Exhibit 7-1, SR 99 traffic would be affected for much of the construction period but not all of it. For both alternatives, traffic on SR 99 would not be affected during construction Stage 1 when utilities are being relocated and during the final construction stage when the Alaskan Way surface street is replaced. In general, the time it takes to build the project decreases the longer SR 99 is closed; however, the intensity of effects to traffic increases when SR 99 is closed.

Exhibit 7-2 shows how long SR 99 would be closed or restricted during construction. When SR 99 is closed, the facility would be closed to all traffic between S. Spokane Street and Denny Way. When SR 99 is restricted, there would be lane and ramp closures on SR 99.

*Exhibit 7-2*
**SR 99 Roadway Closures and Restrictions During Construction**
*in months/years*

| CONSTRUCTION PLAN *Alternative* | SR 99 Closed | SR 99 Restricted[1] | Total Time SR 99 is Affected | Total Construction Time |
|---|---|---|---|---|
| SHORTER *Tunnel* | 42 | 0 | 42 | 84 7 years |
| INTERMEDIATE *Tunnel* | 27 | 36 | 63 | 105 8.75 years |
| LONGER *Elevated Structure* | 3 | 81 | 84 | 120 10 years |

[1] The SR 99 Restricted column shows the amount of time when SR 99 would be subject to lane and ramp closures. This duration does not include the time SR 99 would be closed.

**Note:** Both alternatives could be built under any of the construction plans.

Exhibit 7-3 shows how long various ramp connections would be closed to traffic during construction.

*Exhibit 7-3*
**SR 99 Ramp Closures During Construction**
*in months/years*

| SOUTHBOUND | SHORTER PLAN *Tunnel* | INTEMEDIATE PLAN *Tunnel* | LONGER PLAN *Elevated Structure* |
|---|---|---|---|
| First Avenue/SODO[1] Off-Ramp | 42 | 27 | 3 |
| Downtown On-Ramp | 42 | 27 | 48 |
| Elliott On-Ramp | 42 | 42 | 75 |
| South Lake Union/Denny Ramps | 0 | 0 | 0 |
| **Total Construction Duration** *in months/years* | 84 7 | 105 8.75 | 120 10 |
| **NORTHBOUND** | | | |
| First Avenue/SODO Off-Ramp | 42 | 39 | 27 |
| Downtown Off-Ramp | 42 | 27 | 27 |
| Western Off-Ramp | 42 | 63 | 63 |
| South Lake Union/Denny Ramps | 0 | 0 | 0 |
| **Total Construction Duration** *in months/years* | 84 7 | 105 8.75 | 120 10 |

[1] SODO = South of Downtown.

**Note:** Both alternatives could be built under any of the construction plans.

In addition to closures and restrictions on SR 99, the Alaskan Way surface street would either be reduced to one lane in each direction with occasional closures or closed to traffic, except local access for deliveries and emergency vehicles. Alaskan Way closures and lane reductions for the alternatives and construction plans are shown in Exhibit 7-4.

*Exhibit 7-4*
**Alaskan Way Roadway Closures and Restrictions During Construction**
*in months/years*

| PLAN *Alternative* | Alaskan Way Closed[1] | Alaskan Way Restricted[2] | Total Time Alaskan Way Is Affected | Total Construction Time |
|---|---|---|---|---|
| SHORTER *Tunnel* | 42 | 42 | 84 | 84 7 years |
| INTERMEDIATE *Tunnel* | 63 | 42 | 105 | 105 8.75 years |
| LONGER *Elevated Structure*[3] | 0 | 120 | 120 | 120 10 years |

[1] **Alaskan Way Closed** – This means Alaskan Way would be closed to general traffic, but open to local access for deliveries and emergency vehicles.

[2] **Alaskan Way Restricted** – Alaskan Way would be reduced to one lane in each direction.

[3] For purposes of the analysis, we have assumed Alaskan Way could remain open with one lane in each direction; however, additional closures may be required.

**Note:** Both alternatives could be built under any of the construction plans.

### 2 How would construction affect roadway capacity on SR 99?

During construction, SR 99 would not be able to accommodate as many trips as it normally does due to roadway, lane, and ramp closures. This will affect the more than 110,000 drivers that use the viaduct each day. Exhibit 7-5 on the next page shows the estimated number of daily trips that SR 99 would accommodate during each construction stage. The number of daily trips estimated during construction (119,000 daily trips) is higher than today (110,000) because SR 99

**2006 Appendix C**

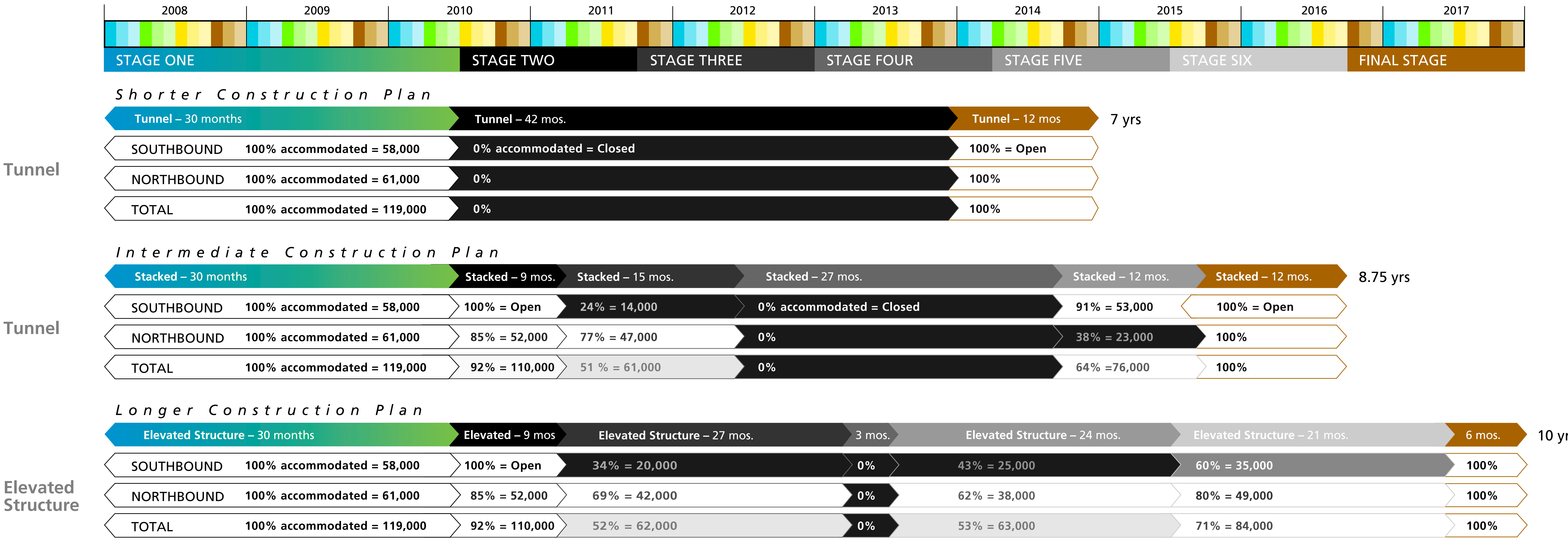
**Section 6.2** and **Section 6.3** of the ***2006 Appendix C, Transportation Discipline Report,*** discuss disruptions to SR 99 traffic and other traffic conditions.

**Why are several stages of construction proposed?**

Construction activities for the alternatives have been organized into several stages based on proposed traffic detours. Currently, three construction stages are proposed under the shorter construction plan. If SR 99 is built following the intermediate construction plan, six stages are proposed. For the longer construction plan, seven stages are proposed. For all of the construction plans evaluated, similar construction activities and traffic detours are proposed for Stage 1 and the final construction stage. Differences among the alternatives and construction approaches occur in the stages between Stage 1 and the final stage.

## SR 99 Traffic Accommodated During Construction

*Percentage of Daily Vehicles Accommodated on SR 99*




*BOTH ALTERNATIVES COULD BE BUILT UNDER ANY OF THE CONSTRUCTION PLANS.*

***Exhibit 7-5***

daily traffic volumes are expected to increase by the time construction begins. Because construction is expected to begin in 2008 and continue for many years, SR 99 daily traffic volumes forecasted for 2010 were used to determine how many trips would be affected by project construction.

### 3 What other routes could drivers use during construction?

It will definitely take longer for SR 99 drivers to get to and from their destinations during construction, but there are many alternate routes drivers could use when SR 99 is closed or traffic is restricted. Most people would probably choose one of the following alternate routes:

1. Trips to and from West Seattle could access downtown from S. Spokane Street using either the First Avenue ramps from the Spokane Street Viaduct/West Seattle Bridge or I-5. An additional westbound off-ramp from the Spokane Street Viaduct to Fourth Avenue may be provided, offering West Seattle drivers another way to get downtown. The West Seattle low-bridge could provide secondary access.
2. Trips to and from SeaTac, Burien, and other communities south of Seattle could access First or Fourth Avenues from SR 99 at Michigan Street. Other alternate routes include Airport Way, Sixth Avenue, and I-5.
3. Trips to and from Fremont, Wallingford, and neighborhoods north of Seattle could continue to use SR 99 to access downtown at or near Denny Way. Other alternate routes include Westlake Avenue N., Dexter Avenue N., and I-5.
4. Trips passing through, rather than to, downtown would predominately use I-5, the downtown street grid, or 15$^{TH}$ Avenue W. This includes trips to/from Ballard, Interbay, or Magnolia that use the Elliott/Western ramps. The primary downtown routes would include First, Second, Fourth, and Fifth Avenues.

5. Longer trips traveling through the City of Seattle would predominately use I-5. Drivers from the south may choose to get to I-5 by traveling on SR 99 or First Avenue S. to access connections to I-5 at S. Royal Brougham Way and S. Atlantic Street.

Many people may also make different transportation choices during construction. For example, for a few years some drivers may decide to use transit, carpool, change their time of travel, take fewer trips, change their destination, or group several trips together to be more efficient.

### 4 How long would construction affect drivers on SR 99?

The fact is that no matter what construction plan or alternative is selected, congestion is going to increase throughout downtown Seattle during construction, making it difficult for drivers to get around for a lengthy period of time. The discussion below explains how long drivers on SR 99 would be affected by construction for each of the plans.

### How long would construction affect drivers heading to or from downtown on SR 99?

As shown below in Exhibit 7-6, drivers heading to and from downtown on SR 99 would be affected by roadway restrictions and ramp closures for a total of 42 to 75 months, depending on the construction plan and alternative selected.

*Exhibit 7-6*

**Duration of Effects to SR 99 Drivers Heading To or From Downtown**

*in months*

| CONSTRUCTION PLAN *Alternative* | SOUTHBOUND | NORTHBOUND | Total Time Round Trips Would Be Affected |
|---|---|---|---|
| SHORTER **Tunnel** | 42 | 42 | 42 |
| INTERMEDIATE **Tunnel** | 42 | 54 | 54 |
| LONGER **Elevated Structure** | 75 | 75 | 75 |

**Note:** Both alternatives could be built under any of the construction plans.

***Shorter Plan – Tunnel Alternative***

With the shorter plan, SR 99 trips to and from downtown would not be affected for the first 30 months of construction during Stage 1 or the final 12 months of construction in Stage 3. Under the shorter plan for the Tunnel Alternative, drivers heading to downtown from the south and drivers heading south to leave downtown would be substantially affected for 42 months during Stage 2 when SR 99 is closed from S. Spokane Street to Denny Way. During this time, these drivers would need to use alternate routes.

In addition, drivers entering and exiting downtown from the north at Denny Way would be affected for up to 42 months because SR 99 would be reduced to three total lanes during construction of improvements proposed north of the Battery Street Tunnel. The three available lanes could be configured either as two northbound lanes and one southbound lane or two southbound lanes and one northbound lane.

***Intermediate Plan – Tunnel Alternative***

With the intermediate plan, SR 99 trips to and from downtown would not be affected for the first two construction stages (the first 39 months of construction) or the final 12 months of construction. Downtown trips would be affected for a total of 54 months during Stages 3 through 5. Downtown trips in the southbound direction would be affected by roadway restrictions and ramp closures for 42 months during Stages 3 and 4. Northbound trips would be affected for 54 months during Stages 3 through 5 as described below.

**Stage 3 (15 months) –** Southbound SR 99 would be open from S. Spokane Street to Columbia Street and closed from Columbia Street to Denny Way. This means that drivers leaving downtown heading south could continue to use the southbound Columbia on-ramp to get to SR 99. Drivers heading into downtown from the south wouldn't be affected during this stage, and they could continue to get to downtown via the Seneca Street ramp.

For drivers entering and exiting downtown from the north at Denny Way, SR 99 would be reduced to three total lanes during construction of improvements proposed north of the Battery Street Tunnel. The three available lanes could be configured either as two northbound lanes and one southbound lane or two southbound lanes and one northbound lane. Drivers could continue to use the Denny Way ramps to get to and from downtown, but congestion would increase in this area.

**Stage 4 (27 months) –** During this stage, SR 99 would be closed, so drivers heading to downtown from the south and those heading south from downtown would need to use alternate routes. Traffic effects would be similar to the shorter plan, except that SR 99 would be closed for 27 months instead of 42 months.

Conditions for drivers entering and exiting downtown from the north at Denny Way would be the same as described for Stage 3. SR 99 would be reduced to three total lanes during construction of improvements proposed north of the Battery Street Tunnel. Drivers could continue to use the Denny Way ramps to get to and from downtown, but congestion would increase in this area.

**Stage 5 (12 months) –** Traffic heading northbound from the south would be most affected during this stage because SR 99 would be closed between S. King Street and Denny Way. Drivers heading to downtown from the south would be able to travel on SR 99 up to S. King Street. At S. King Street, drivers would be forced off of SR 99 at either S. Atlantic Street or Alaskan Way near S. King Street. Drivers could then get to their downtown destination by using city streets. Drivers leaving downtown heading south would get to SR 99 using the new ramp from Alaskan Way near S. King Street.

During this stage, construction north of the Battery Street Tunnel would be completed, so drivers entering and exiting downtown from the north at Denny Way wouldn't be affected by construction in this area; however, since the northbound lanes of SR 99 would be closed, more traffic would enter SR 99 in this area.

***Longer Plan – Elevated Structure Alternative***

With the longer plan, SR 99 drivers heading to and from downtown wouldn't be affected by roadway restrictions and ramp closures during the first 39 months of construction and the last 6 months of construction. Drivers heading to and from downtown Seattle in both directions would be affected for a total of 75 months during Stages 3 through 6.

**Stage 3 (27 months) –** In this stage, southbound traffic would be affected to a much greater degree than northbound traffic. Southbound traffic leaving downtown could use the Columbia Street on-ramp to bypass Pioneer Square, but SR 99 would be reduced to two lanes and rerouted at Railroad Way S. to the First Avenue S. Detour shown in Exhibit 7-7. The First Avenue S. Detour would substantially increase traffic compared to existing conditions on First Avenue S. from Railroad Way S. to S. Spokane Street. Drivers heading northbound into downtown from the south could continue to use the Seneca Street off-ramp, but SR 99 would be restricted to two lanes in each direction, which would increase congestion on SR 99.

As described for Stage 3 of the intermediate plan for the Tunnel Alternative, drivers entering and exiting downtown from the north could continue to use the Denny Way ramps as they do today, but SR 99 would be reduced to three total lanes. These lane restrictions would increase congestion in this area. The three available lanes could be configured either as two northbound lanes and one southbound lane or two southbound lanes and one northbound lane.

**Stage 4 (3 months) –** During this stage, SR 99 would be closed, so drivers heading to downtown from the south and those heading south from downtown would need to use alternate routes. Conditions for drivers entering and exiting downtown from the north at Denny Way would be the same as described for Stage 3.

**Stage 5 (24 months) –** During this stage, SR 99 would be restricted to two lanes in each direction and the Columbia and Seneca Street ramps would be closed. This means that traffic leaving downtown heading south and traffic heading into downtown from the south would need to use alternate routes between S. Spokane Street and downtown. Traffic leaving downtown to head north or coming into downtown from the north could use ramps at or north of Denny Way. Traffic congestion would be less than in Stages 3 and 4 since construction north of the Battery Street Tunnel would be completed.

**Stage 6 (21 months) –** In Stage 6, SR 99 would continue to be restricted to two lanes in each direction, and the Columbia Street ramp would be closed. Drivers leaving downtown to head south would need to find alternate routes. Drivers from the south heading to downtown would be able to use the Seneca Street off-ramp. Traffic leaving downtown to head north or coming into downtown from the north could use ramps at or north of Denny Way.


Exhibit 7-7

### How long would construction affect drivers heading through downtown on SR 99?

As shown in Exhibit 7-8, drivers heading through downtown on SR 99 would be affected by roadway restrictions and ramp closures for a total of 42 to 75 months, depending on the construction plan and alternative selected.

*Exhibit 7-8*

**Duration of Effects to SR 99 Drivers Heading Through Downtown**

*in months*

| CONSTRUCTION PLAN *Alternative* | SOUTHBOUND | NORTHBOUND | Total Time Round Trips Would Be Affected |
|---|---|---|---|
| SHORTER *Tunnel* | 42 | 42 | 42 |
| INTERMEDIATE *Tunnel* | 42 | 54 | 54 |
| LONGER *Elevated Structure* | 75 | 75 | 75 |

**Note:** Both alternatives could be built under any of the construction plans.

***Shorter Plan – Tunnel Alternative***
With the shorter plan, SR 99 trips through downtown would not be affected for the first 30 months of construction or the final 12 months of construction. Drivers traveling through Seattle would be affected during Stage 2 when SR 99 is closed for 42 months.

***Intermediate Plan – Tunnel Alternative***
With the intermediate plan, SR 99 trips through downtown would not be affected for the first two construction stages (the first 39 months of construction) or the final 12 months of construction. Through trips would be affected for a total of 54 months during Stages 3 through 5. Through trips in the southbound direction would be affected by roadway and ramp restrictions for 42 months during Stages 3 and 4. Northbound trips would be affected for 54 months during Stages 3 through 5 as described below.

**Stage 3 (15 months)** – During Stage 3, southbound SR 99 would be closed from Columbia Street to Denny Way. Southbound drivers heading through downtown would need to use other routes, such as surface streets and I-5. Drivers heading northbound through downtown would be less affected, since SR 99 would remain open. North of Denny Way, SR 99 would be reduced to three lanes total, which would increase congestion in this area.

**Stage 4 (27 months)** – SR 99 would be closed to all traffic between S. Spokane Street and Denny Way, so drivers heading through downtown would need to use alternate routes. North of Denny Way, SR 99 would be reduced to three lanes total, which would increase congestion in this area.

**Stage 5 (12 months)** – Northbound through trips would need to find other routes during this stage because SR 99 would be closed from S. King Street up to Denny Way. Southbound through trips would be routed to the new tunnel and could continue to use SR 99.

***Longer Plan – Elevated Structure Alternative***
With the longer plan, SR 99 drivers heading through downtown wouldn't be affected by roadway restrictions and ramp closures during the first two construction stages (39 months of construction) and the last 6 months of construction. Drivers heading to and from downtown Seattle in both directions would be affected by roadway restrictions and ramp closures for a total of 75 months during Stages 3 through 6.

**Stage 3 (27 months)** – In this stage, northbound traffic heading through Seattle could continue to use the viaduct, though traffic would be reduced to two lanes from S. Spokane Street to Denny Way. North of Denny Way, SR 99 would be reduced to three lanes total, increasing congestion in this area.

Southbound trips heading through downtown would be most affected by construction during this stage because southbound SR 99 traffic would be routed onto the Broad Street Detour, a portion of SR 99, and the First Avenue S. Detour.

Exhibit 7-9 on the next page shows the Broad Street Detour. Southbound drivers would be diverted off of SR 99 at Broad Street and continue on Broad Street, where they would be routed on a temporary trestle connecting to the Alaskan Way surface street.

The temporary aerial trestle would be built over the railroad tracks at Broad Street from approximately the intersection of Alaskan Way and Vine Street up to the intersection of Broad Street and Western Avenue, as shown in Exhibit 7-9. Southbound SR 99 traffic would continue to travel south on Alaskan Way until it would connect to the existing viaduct via a temporary aerial structure near Pike Street. Southbound drivers would continue on the viaduct to Railroad Way S., where they would be diverted via the existing First Avenue S. off-ramp. Drivers would continue down First Avenue S. to S. Spokane Street on the First Avenue S. Detour.

The Broad Street Detour would substantially increase traffic on Broad Street and Alaskan Way north of Pike Street compared to existing conditions. The First Avenue S. Detour would substantially increase traffic compared to existing conditions on First Avenue S. from Railroad Way S. to S. Spokane Street.

**Stage 4 (3 months)** – SR 99 would be closed to all traffic between S. Spokane Street and Denny Way, so drivers heading through downtown would need to use alternate routes. North of Denny Way, SR 99 would be reduced to three lanes total, which would increase congestion in this area.

**Stage 5 (24 months)** – During this stage, southbound and northbound traffic on SR 99 would be restricted to two lanes. South-bound trips heading through downtown would continue to be routed to the Broad Street Detour, connecting to SR 99 at Pike Street. Once southbound drivers made it to Pike Street, they could continue to travel on SR 99 to S. Spokane Street. Northbound through traffic could continue to travel on the viaduct.

**Stage 6 (21 months)** – During this stage, SR 99 would be open but restricted to two lanes in each direction.

### How long would construction affect trips to or from Ballard and Interbay?

As shown in Exhibit 7-10, drivers heading to and from the Ballard/Interbay area would be affected by roadway restrictions and ramp closures for a total of 42 to 84 months, depending on the construction plan and alternative selected.

*Exhibit 7-10*
**Duration of Effects to SR 99 Drivers Heading To or From Ballard and Interbay**
*in months*

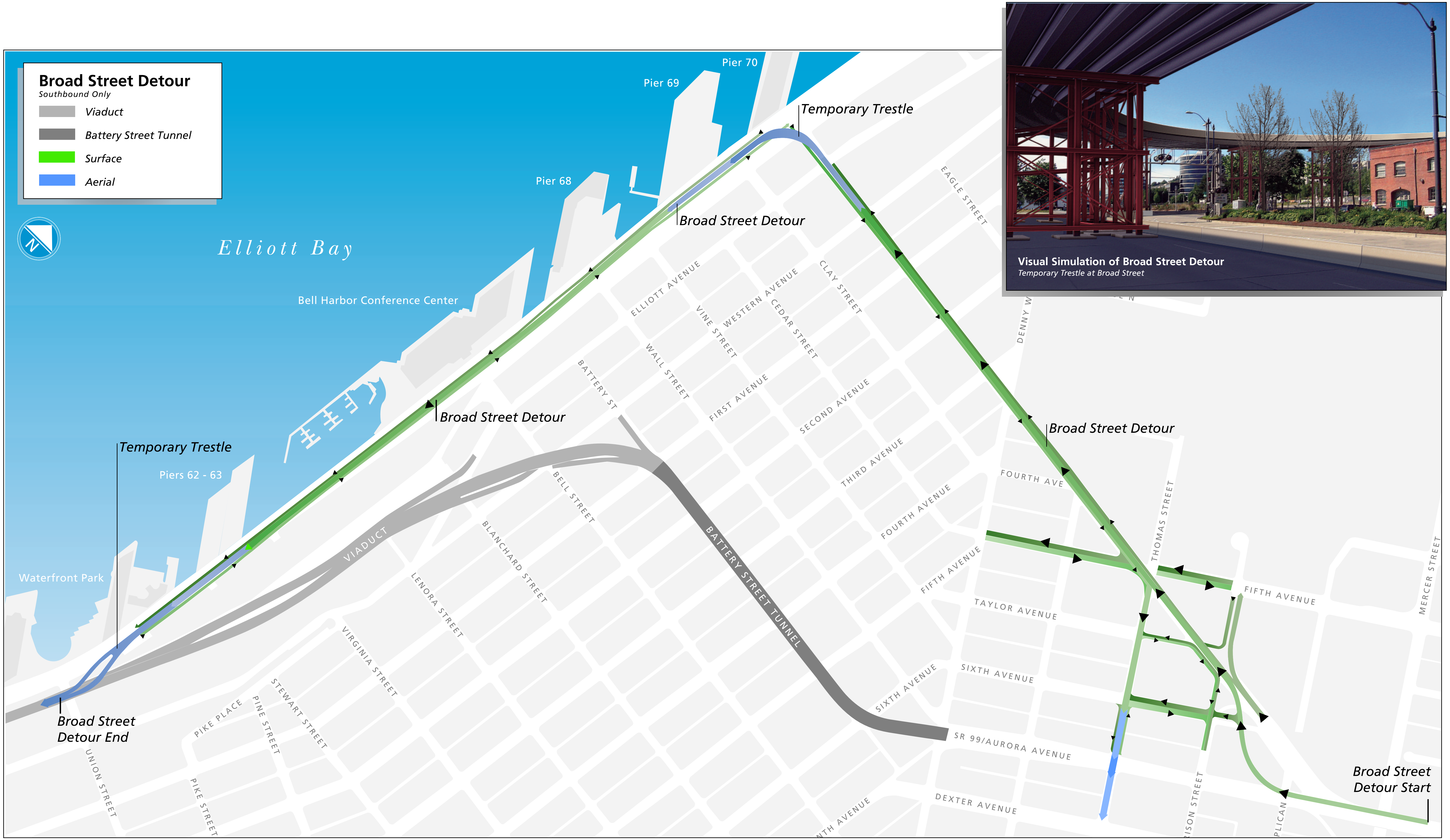
| CONSTRUCTION PLAN *Alternative* | SOUTHBOUND | NORTHBOUND | Total Time Round Trips Would Be Affected |
|---|---|---|---|
| SHORTER *Tunnel* | 42 | 42 | 42 |
| INTERMEDIATE *Tunnel* | 42 | 63 | 63 |
| LONGER *Elevated Structure* | 75 | 84 | 84 |

***Note:*** *Both alternatives could be built under any of the construction plans.*

***Shorter Plan – Tunnel Alternative***
With the shorter plan, SR 99 trips to or from the Ballard/Interbay area would not be affected for the first 30 months of construction or the final 12 months of construction. Drivers traveling to or from the

**How long would the First Avenue S. and Broad Street Detours be in place for the Elevated Structure Alternative?**

With the longer plan, the First Avenue S. Detour would be in place for 27 months for the Elevated Structure Alternative. The Broad Street Detour would be in place for 51 months.




**Visual Simulation of Broad Street Detour**
*Temporary Trestle at Broad Street*

Ballard/Interbay area would be affected during Stage 2 when SR 99 is closed for 42 months.

***Intermediate Plan – Tunnel Alternative***

With the intermediate plan, traffic effects to drivers heading to or from the Ballard/Interbay area would be similar to those described previously for drivers heading through downtown. The only difference is that Ballard/Interbay traffic would be affected for an additional 9 months when the Western off-ramp is closed during Stage 2. As a result, Ballard/Interbay trips would be affected for a total of 63 months during Stages 2 through 5. Trips in the southbound direction would be affected by roadway and ramp restrictions for 42 months during Stages 3 and 4. Northbound trips would be affected for 63 months during Stages 2 through 5.

***Longer Plan – Elevated Structure Alternative***

With the longer plan, traffic effects to drivers heading to or from the Ballard/Interbay area would be similar to those described previously for drivers heading through downtown. The only difference is that Ballard/Interbay traffic would be affected for an additional 9 months when the Western off-ramp is closed during Stage 2. As a result, Ballard/Interbay trips would be affected for a total of 84 months during Stages 2 through 5. Trips in the southbound direction would be affected by ramp and roadway restrictions for 75 months during Stages 3 through 6. Northbound trips would be affected for 84 months during Stages 2 through 6, though the Western off-ramp would be closed for a total of 63 months.

## 5 How would construction affect other trips?

### How would construction affect transit?

Construction would affect transit in many ways. Transit currently uses SR 99 to reach downtown via the Columbia Street and Seneca Street ramps and the Denny Way ramps. When SR 99 is closed or restricted, buses would be rerouted to alternate routes. Transit that currently uses the Seneca and Columbia ramps would most likely be routed to the E-3 Busway, First Avenue S., or Fourth Avenue S.

Transit that currently uses the Denny Way ramps would most likely continue to use these ramps, even when SR 99 is restricted to three lanes total north of the Battery Street Tunnel.

When transit is rerouted due to closures or restrictions on SR 99, increased road congestion would affect transit services, particularly during peak commute hours. Conditions for transit service would be most congested when SR 99 is closed in both directions. Transit operators would also face congestion when SR 99 is restricted. Exhibit 7-11 shows how long transit operations would be affected by closures and lane restrictions on SR 99 for the construction plans and alternatives.

*Exhibit 7-11*

**Duration of Transit Effects During Construction**
*in months*

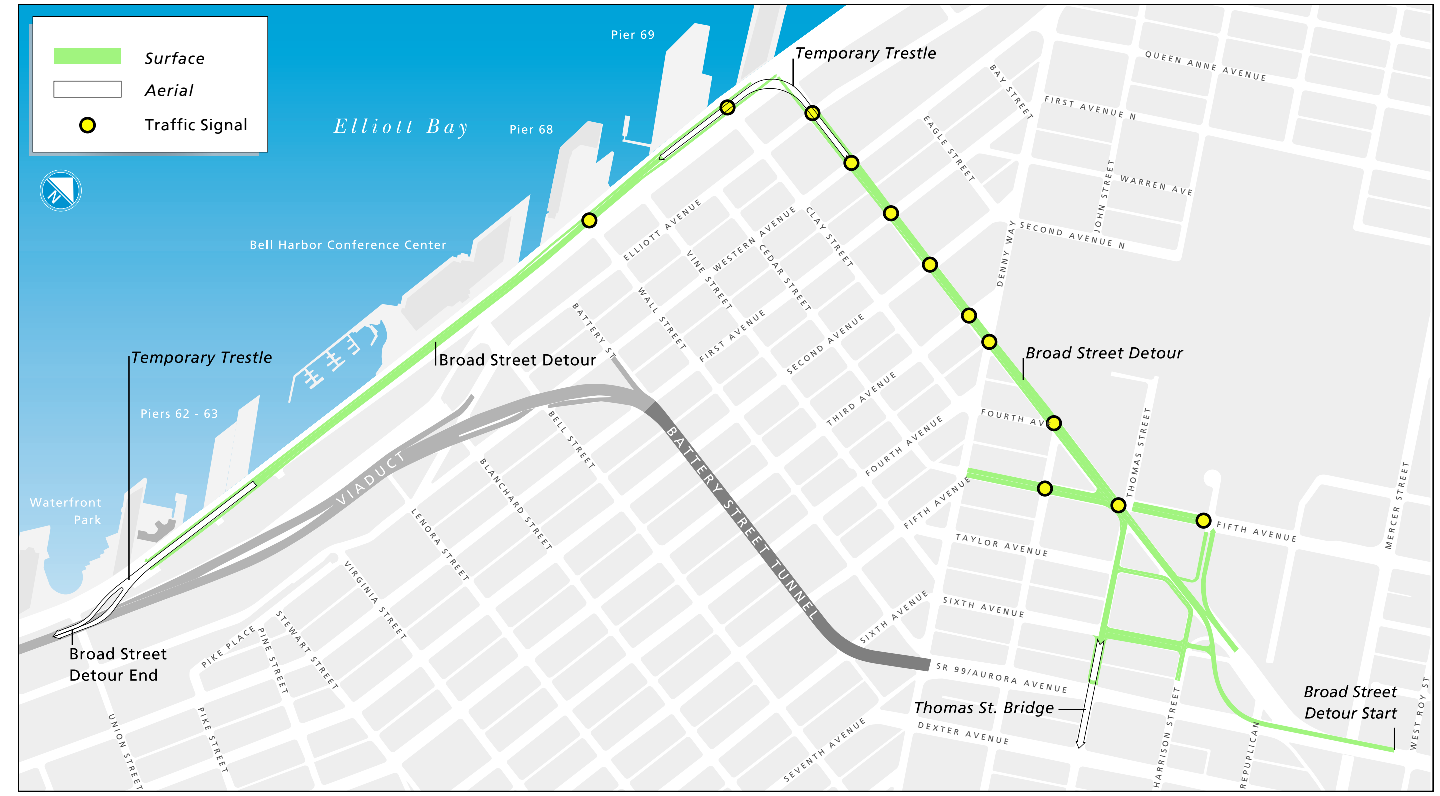
| | |
|---|---|
| SHORTER PLAN – ***Tunnel*** | 42 |
| INTERMEDIATE PLAN – ***Tunnel*** | 63 |
| LONGER PLAN – ***Elevated Structure Alternative*** | 75 |

***Note:*** *Both alternatives could be built under any of the construction plans.*

In addition, the waterfront streetcar would not be available for the entire construction period for either alternative. Currently, the streetcar is operating as a bus route while King County Metro Transit is in the process of building a new maintenance shed. The streetcar was proposed to be back in operation sometime during 2007 before construction begins.[1] However, it may not be back in operation until after the viaduct and seawall are replaced. Shuttle service could be provided to mitigate the loss of the waterfront streetcar during construction, though it may need to be routed to a different street. Once construction is completed, the streetcar would be replaced with either a double-track system for the Tunnel Alternative or a single-track system for the Elevated Structure Alternative.

We will work with transit providers to develop acceptable alternate routes as needed. In addition, we will enhance transit during construction as part of the project's Construction Transportation Management Plan discussed in Question 7 of this chapter.

## Traffic Signals Along Broad Street Detour




### How would construction affect freight?

Because roadway capacity on SR 99 would be reduced during construction, congestion would increase on alternate routes. Reduced roadway capacity on SR 99 would affect many drivers, including freight operators. Specific effects to freight would be similar to those described above for trips heading to, from, or through downtown. In the south section, access to E. Marginal Way would be maintained throughout construction to allow freight to move between the ports, railroads, and the other major highways used by freight. Freight traffic to and from Ballard would be affected by lengthy closures of ramps to Elliott and/or Western Avenues. The project partners are currently working with the freight community to learn how and when drivers use SR 99. This information will be used to develop strategies for managing freight traffic during construction. These freight management strategies will be fully described in the Construction Transportation Management Plan and the Final EIS.

**2006 Appendix C**

**Section 6.3.3** of the ***2006 Appendix C, Transportation Discipline Report,*** provides additional information about effects to transit.

[1] King County 2006.

**How would ferry traffic be accommodated during construction?**

Ferry access would remain open throughout construction for both alternatives and all construction plans. For both alternatives, a temporary over-water bridge would be built to provide access to drivers entering and exiting the Colman Dock Ferry Terminal during construction.

The temporary bridge would be built between Pier 48 (near S. Jackson Street) and Colman Dock during the first stage of construction and it would be removed in the final stage. Drivers would access the temporary bridge from First Avenue via S. Jackson Street. This connection would also provide queuing space for traffic entering the ticketing area at Colman Dock. Throughout most of the construction period, this route and an additional exit at Marion Street would be maintained for Colman Dock. However, there may be times when access may be restricted to one location. It is unknown at this time how often or how long these interruptions might occur. While in place, these restrictions could increase the amount of time it takes to unload the ferry.

During construction, drivers heading to and from the ferry would experience more roadway congestion near Colman Dock than they do today. For example, roadways leading to Colman Dock would be more congested when SR 99 is closed than when only a portion of traffic is detoured from SR 99. Roadways leading to Colman Dock from the south would also be more congested when the First Avenue S. Detour is used.

Ferry access for pedestrians would also be maintained during construction, both at street level and on the existing pedestrian bridge that crosses Alaskan Way at Marion Street. The Marion Street bridge would most likely be replaced as part of the project, but it would remain open during construction. If at any point the existing pedestrian bridge is closed, an alternate connection between the waterfront and First Avenue would be provided.

**How would bicycle and pedestrian traffic be accommodated during construction?**

For safety, pedestrian and bicycle access on Alaskan Way would be limited during construction. Bicycles would be routed to other city streets, but pedestrian connections would be provided to ensure that people on foot would still be able to make their way to and from businesses and destinations located along the waterfront. In particular, east-west access to businesses and activities on piers would be provided. Ferry access would also be maintained for pedestrians and bicycles. To help maintain pedestrian access along the west side of the waterfront during construction, the project partners are considering the feasibility of constructing temporary over-water pedestrian walkways between some piers.

**How would the other design choices affect traffic on SR 99?**

**South –** If the Relocated Whatcom Railyard is built in the south, it would require the south section of SR 99 to be closed to both directions of traffic for at least 12 months. During this time, both directions of traffic on SR 99 would be routed to First Avenue S., increasing congestion on this city street.

**Central –** A side-by-side tunnel would take about 9 months less time to build than a stacked tunnel under the intermediate plan. This means that a side-by-side tunnel could be built under the intermediate plan in 8 years instead of 8.75 years. A side-by-side tunnel would require SR 99 to be closed to both directions of traffic for 18 months instead of 27 months as described for the stacked tunnel. However, a side-by-side tunnel could only be built in 8 years under the intermediate plan if SR 99 were built over Elliott and Western Avenues. A side-by-side tunnel with SR 99 built under Elliott and Western Avenues would take 8.75 years to build. With the shorter construction plan, a stacked or side-by-side tunnel would take the same amount of time to build whether SR 99 is built over or under Elliott and Western Avenues.

**North –** If the Battery Street Tunnel curves are widened, about half of the lid over the Battery Street Tunnel would need to be removed, requiring both the Battery Street Tunnel and Battery Street to be closed to traffic for 12 to 18 months. At the southwest end of the tunnel, the lid would be removed from the portal near First Avenue to about Second Avenue. At the northeast end, the lid would be removed from the portal to about Fifth Avenue. Temporary roadway decking would be placed over the Battery Street Tunnel at First Avenue, Fifth Avenue, Sixth Avenue, and Denny Way so traffic could continue to use these cross-streets during construction. Battery Street would not need to be closed if the curves remain as they are today.

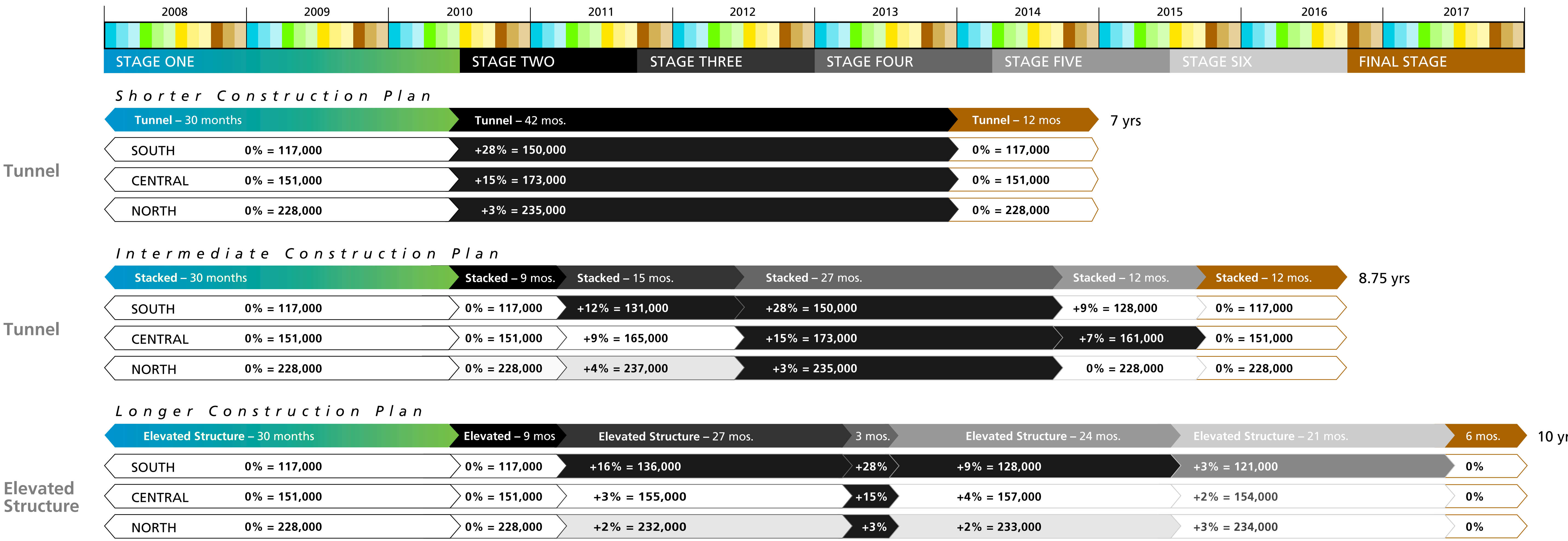
**6 How would construction affect traffic and congestion on other routes?**

Proposed roadway restrictions on SR 99 during construction would cause traffic volumes to increase on alternate routes such as I-5 and downtown city streets. Because capacity on many alternate routes is limited, increased traffic volumes on these routes would not only increase the magnitude of congestion, but also the frequency and duration of congestion. The discussion below identifies how long congestion may occur on SR 99 and other roadways during construction; however, this information describes what congestion may be like if no other traffic management strategies are implemented to help minimize and mitigate congested conditions during construction. The project partners plan to develop a Construction Transportation Management Plan to help keep people and traffic moving during construction. This plan is discussed in Question 7.

The text and exhibits that follow show where traffic is predicted to shift when SR 99 is either closed or restricted during construction.

## Increases in Daily Traffic on City Streets West of I-5

*During SR 99 Construction*




*BOTH ALTERNATIVES COULD BE BUILT UNDER ANY OF THE CONSTRUCTION PLANS.*

*Exhibit 7-12*

**How would construction affect SR 99?**

Proposed SR 99 closures, restrictions, and detours have been discussed in previous sections. However, it's important to point out that when SR 99 is open but restricted (construction Stages 3 through 5 for the Tunnel Alternative under the intermediate plan or construction Stages 3 through 6 for the Elevated Structure Alternative under the longer plan), overall congestion would increase, causing delays for drivers. Currently, under typical conditions SR 99 is congested about 1 hour per day or less. When SR 99 is restricted during construction, SR 99 is expected to have slow-moving, congested conditions for 10 to 12 hours per day depending on lane restrictions.

**How would construction affect city streets west of I-5?**

Exhibit 7-12 shows the daily traffic increases expected on city streets west of I-5. Changes in north-south traffic volumes have been forecasted at the following locations:

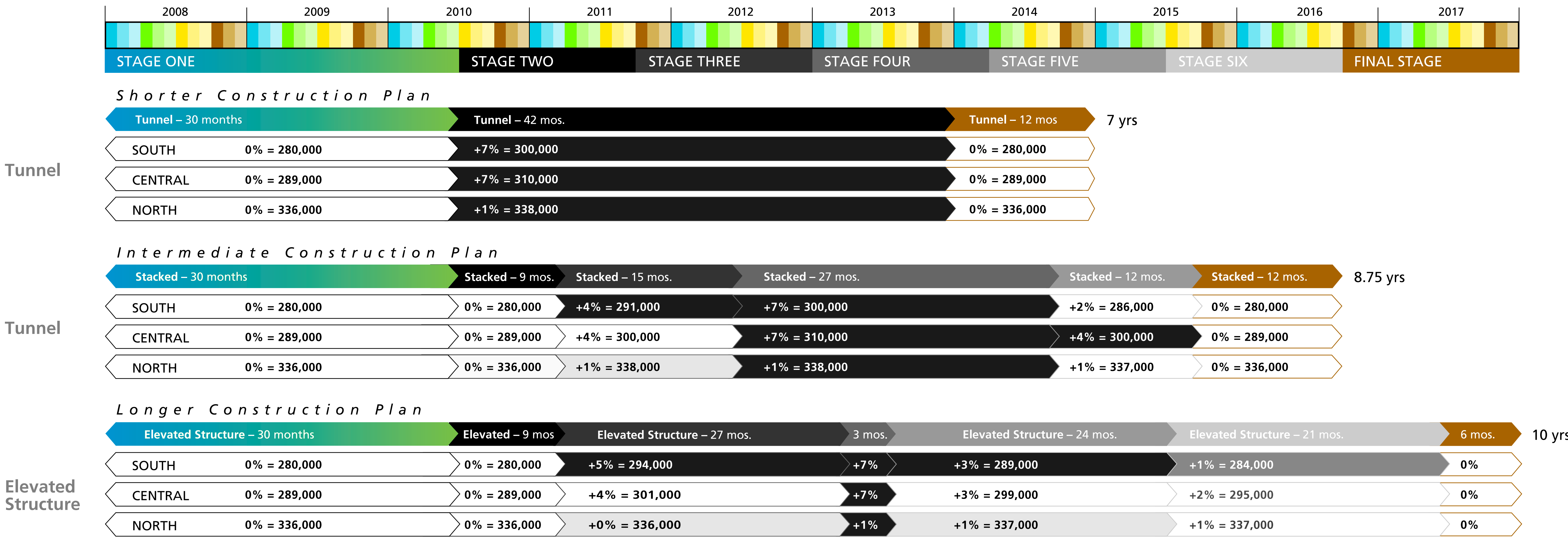
- **South of downtown** – S. Spokane Street
- **Downtown** – Madison Street
- **North of downtown** – Mercer Street

Exhibit 7-12 shows that traffic is projected to increase on city streets, primarily in and south of downtown during stages when SR 99 is closed or trips are restricted. As expected, traffic increases on alternate routes, such as downtown city streets, would be the same between alternatives anytime SR 99 is closed, though the duration of these effects varies greatly depending on the construction plan selected.

Under normal conditions when SR 99 is open, traffic congestion typical of a weekday commute typically occurs on downtown city streets and streets south of downtown for about 3 to 4 hours per day. When SR 99 is closed, these congested conditions could

## Increases in Daily Traffic on I-5

*During SR 99 Construction*




*BOTH ALTERNATIVES COULD BE BUILT UNDER ANY OF THE CONSTRUCTION PLANS.*

*Exhibit 7-13*

occur for 10 to 13 hours per day for streets located in and south of downtown. During other construction stages when SR 99 is affected but not closed, these streets could be congested for 5 to 10 hours per day.

**How would construction affect I-5?**

Traffic is also projected to increase on I-5 when SR 99 is closed or restricted. Exhibit 7-13 shows that several thousand trips each day would shift to I-5, mostly in the south and central downtown area. I-5 currently operates near its maximum capacity, and congested conditions typical of a weekday commute are prevalent for between 5 and 8 hours per day. When SR 99 is completely closed, this level of congestion could be expected for 9 to 14 hours per day. During other construction stages when SR 99 is restricted, this degree of congestion could be expected for 8 to 12 hours per day.

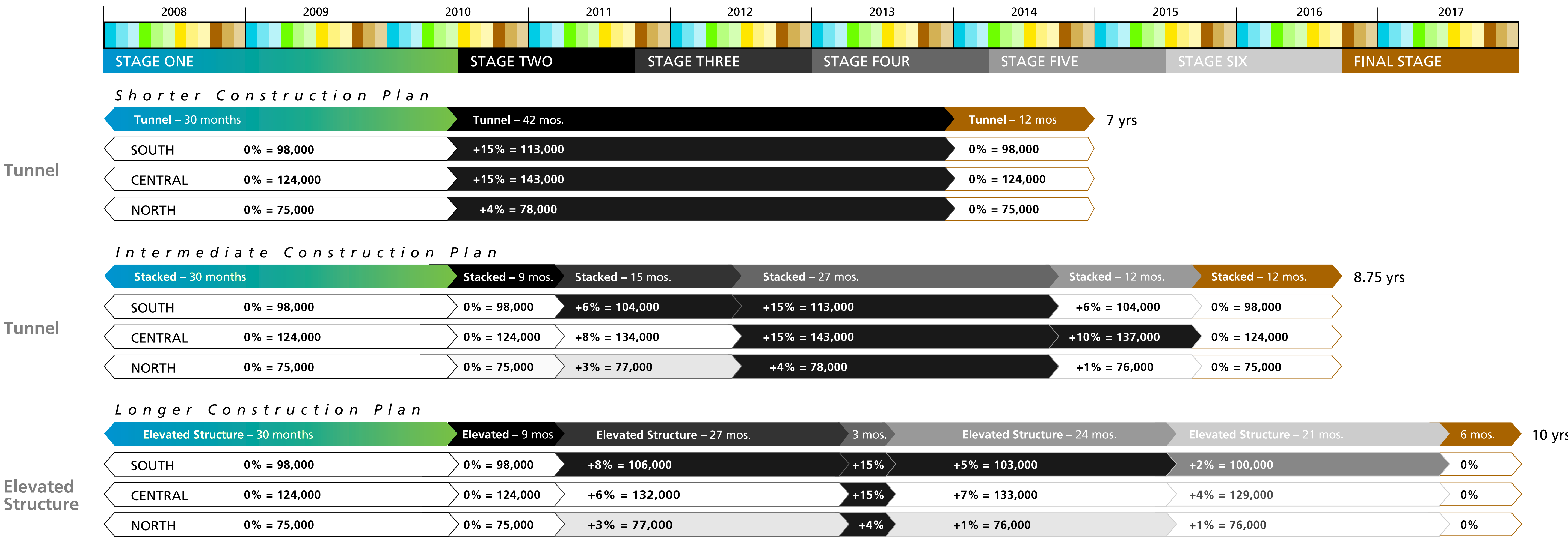
**How would construction affect city streets east of I-5?**

North-south traffic through Seattle is also projected to shift to several routes east of I-5 when SR 99 is completely closed or lanes are restricted. Most of these diverted trips would not come directly from SR 99, but would come from I-5 or other city streets because of increased congestion in the overall transportation network. Exhibit 7-14 shows the number of trips expected to shift to streets east of I-5. Similar to information presented for streets west of I-5, the number of hours drivers would experience congestion during the day is expected to increase when SR 99 is closed or restricted.

**How would construction affect I-405?**

A small share of traffic, specifically longer-distance through trips, may shift to I-405. When SR 99 is closed, I-405 may see as many as 1,000 to 2,000 additional trips each day. Given the volume of traffic that

## Increases in Daily Traffic on City Streets East of I-5
*During SR 99 Construction*




*BOTH ALTERNATIVES COULD BE BUILT UNDER ANY OF THE CONSTRUCTION PLANS.*

*Exhibit 7-14*

travels on I-405 each day, this possible increase is seen as minimal.

**How would the total volume of north-south trips be affected?**

Even though traffic volumes on alternate routes such as city streets and I-5 would increase during construction, the total traffic volumes for north-south routes through central downtown Seattle are expected to decrease during construction by an estimated 7 percent when SR 99 is closed and up to 4 percent during stages when SR 99 is restricted. The total number of north-south trips is expected to decrease because when SR 99 is closed or restricted, available roadway capacity on alternate north-south routes would be extremely limited and congestion on these routes is expected to be high compared to existing conditions. As a result, many people would make different transportation choices during construction. For example, for a few years some drivers may decide to use transit, carpool, change their time of travel, take fewer trips, change their destination, or group several trips together to be more efficient. Question 7 describes some of the strategies the project partners plan to employ during construction to help minimize effects to traffic during SR 99 construction.

### 7 What would we do to keep people and traffic moving during construction?

The project partners will develop a Construction Transportation Management Plan designed to help keep as much traffic moving as possible during construction. We are continuing to look for ways to minimize effects to traffic during construction. No matter what plan is put in place, transportation through the corridor will be difficult during construction. The plan must balance construction costs, neighborhood and business needs, and traffic management. As part of the plan, we will identify, develop, and test cost-effective improvements that can help move traffic during construction, and we will discuss ways to implement these specific improvements to the transportation system. We will share this information with the public and use public comments and the information learned from testing to develop the complete list of strategies and projects to be put in place as part of the project's Construction Transportation Management Plan.

The Draft EIS identified many possible strategies and projects that could be put in place to minimize effects to traffic during construction. Since the Draft EIS was published, the project partners have continued to develop and refine the list, which now includes over 130 ideas that address the following goals:

- Maintain reliable transit service to retain and increase transit use.
- Improve and expand transit service in affected corridors to provide travelers with a viable alternative to single-occupant vehicles.
- Maintain or increase roadway capacity on local streets to help absorb traffic shifts during construction.
- Manage traffic effectively to prioritize the movement of people and goods, using limited roadway capacity in the best possible ways.
- Enhance traveler information so travelers can make more informed decisions.
- Manage transportation demand effectively to provide all travelers with more choices of mode, location, route, and time of travel.

At this time, the Washington State Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), the City of Seattle, and King County Metro Transit have identified 31 key strategies that they believe will do the most to keep traffic moving during construction. Additional strategies and projects from the overall list will be added once they have been evaluated and presented to the public for review and comment. The 31 key strategies the project partners believe will do the most to keep traffic moving are listed below:

**Maintain Reliable Transit Service**

1. Retain projects put in place for managing traffic during closure of the Downtown Seattle Transit Tunnel. Specifically, reinstate the Third Avenue Transit Corridor.
2. Apply transit priority treatments (such as dedicated bus-only lanes) along key transit routes to make transit a more competitive travel option and minimize transit operating costs.
3. Provide additional transit service hours and buses to help maintain current levels of service where trip times increase due to construction.

**Improve and Expand Transit Service in Affected Corridors**

4. Provide more frequent and reliable transit service in corridors directly affected by project construction, specifically:
   - **West Seattle** – provide a reliable roadway connection from the Spokane Street Viaduct/West Seattle Bridge to the E-3 Busway.
   - **Ballard and Interbay** – provide signal priority and other transit speed and reliability treatments and a reliable connection crossing Denny Way.
   - **SR 99/Aurora Avenue N.** *(***within the city of Seattle***)* – provide a southbound bus lane, parking restrictions, a reliable connection crossing Denny Way, and other treatments to be determined.
5. Provide transit service targeted to trips passing through downtown Seattle to destinations such as the University of Washington and the Seattle-Tacoma International Airport.
6. Provide additional or new service to select park-and-ride locations with reserve capacity.
7. Identify and secure underused weekday parking for temporary park-and-ride lots during construction. Provide new or expanded transit service to these locations.

**Maintain or Increase Capacity on Local Streets**

8. During construction, remove on-street parking along First, Second, and Fourth Avenues in downtown Seattle and convert these areas to traffic lanes.
9. Work with private parking suppliers to encourage provision of adequate short-term parking supply throughout downtown, with a focus on major commercial corridors such as the waterfront, Pioneer Square, and the central retail area.
10. Revise intersection lane configurations and street connections in the vicinity of the First Avenue S. Bridge (SR 509) to distribute northbound traffic to First and Fourth Avenues S.
11. Strictly manage rights-of-way to control street construction work during peak travel times.
12. Maintain sidewalk capacity for pedestrians.
13. Restrict use of downtown streets for construction and maintenance.
14. Reorient downtown truck deliveries to off-hours.

**Manage Traffic Effectively**

15. Expand the traffic signal preemption system for emergency vehicles on critical downtown corridors.
16. Establish a joint, physical or virtual, coordinated (WSDOT, Seattle Department of Transportation, King County Metro Transit, Sound Transit, and other agencies) Traffic Management Center (TMC).
17. Enhance traffic management for special event traffic and incorporate into joint TMC operations.
18. Ensure joint TMC operations are provided 7 days a week.
19. Increase efficiency on I-5 by implementing management strategies from the Boeing Access Road to Northgate Way interchanges.
20. Upgrade traffic incident management systems, including enhanced detection, monitoring, and response.
21. Identify key local street corridors for responsive traffic signal control system options in downtown and other key areas. Provide communication connections to the TMC.
22. Implement multiple traffic signal timing and control system options for downtown and other key streets.

**Enhance Traveler Information**

23. Enhance systems to provide multimodal traveler information, including freight. Expand regional and local network coverage to provide real-time traveler information via enhanced 511, variable

**Where can I find the full list of traffic management strategies being considered?**

**Section 6.4.1** of the **2006** ***Appendix C, Transportation Discipline Report***, contains the complete list of strategies being considered.

message signs, cell phone, personal digital devices, and the Internet.

24. Provide real-time driver travel time information to enable informed route choice.
25. Provide marketing of traveler information sources.
26. Expand flow map coverage to include key truck routes.

**Manage Transportation Demand Effectively**

27. Expand availability and use of employer transit and vanpool passes by subsidizing their costs to users, including smaller downtown and industrial area employers.
28. Implement marketing programs to employers to encourage alternate work hours and telecommuting.
29. Provide marketing of multimodal travel alternatives, including individualized trip planning assistance.
30. Expand carpool/ridematch/vanpool programs to address key markets.
31. Implement expanded marketing and outreach programs to Commute Trip Reduction employer sites to achieve higher participation.

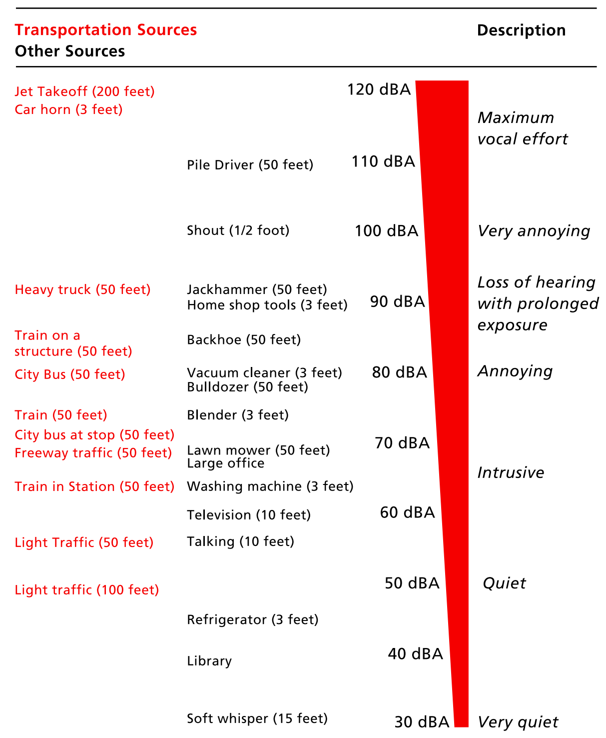
## 8 How would noise during construction affect the surrounding area?

Noise during the construction period would be similar to what was described in the Draft EIS for both alternatives. The primary difference is that this document also evaluates noise effects for a larger area north of the Battery Street Tunnel to Comstock Street.

Noise during the construction period would be bothersome and annoying to nearby residents, visitors, tourists, and businesses because it would make it unpleasant to be outside and hard to hold conversations. Near residences, noise from nighttime construction activities could be particularly disruptive. The most common noise sources during all stages of construction would be from machine engines such as bulldozers, cranes, generators, and other earth- and material-moving equipment. Demolition of the existing viaduct and impact pile-driving, if used as a method for pile placement, would be the loudest and most disruptive construction work. Impact pile-driving would only be used in rare instances, such as for the temporary access bridge near Colman Dock, if other less disruptive pile placement methods could not be used.

*Exhibit 7-15*

**Typical Sound Levels**




*Source: FTA 1995, EPA 1971, EPA 1974*

Typical noise levels from construction equipment range from 69 to 106 dBA at 50 feet from the source. Exhibit 7-15 provides a range of typical sound levels to help explain what these dBA readings mean. The majority of construction activities would fall within the range of 75 to 85 dBA at 50 feet, with some activities like impact pile driving reaching around 100 dBA at 50 feet. The project corridor is currently noisy, with peak hour average daytime sound levels that range from 57 to 81 dBA.

High-intensity noise events would correspond with construction activities such as concrete saw cutting and demolishing the viaduct. These noise levels would vary considerably throughout each construction stage as the type and location of the construction activities change. Businesses on the waterfront piers and businesses and residences adjacent to the viaduct would be bothered by the duration and intensity of these activities.

Construction activities are planned to occur up to 24 hours a day, 7 days a week throughout construction. Nighttime noise is expected during all construction stages; however, during the final construction stage nighttime construction activities would be more sporadic.

## 9 Would vibration during construction affect surrounding areas?

The effects of vibration from construction activities would be similar to those described in the Draft EIS. Construction activities that would cause vibration include pile driving, demolition, jack hammers, and heavy machinery.

Buildings will be evaluated on a case-by-case basis during final project design to determine what specific mitigation measures would be needed to minimize vibration effects. The Seattle Aquarium will also be carefully evaluated during final design to determine any specific mitigation measures needed for organisms living at the facility.

The risk to underground utilities from construction vibration is unknown because the construction methods are under development; however, the risk is expected to be low. Utilities less than 25 feet away from construction may need to be evaluated further during final design to determine if mitigation is needed.

## 10 How would views be affected during construction?

The effects of construction on views in the project area are virtually the same as those discussed in the Draft EIS. During construction, views in the project area would be affected by staging areas, heavy equipment, drill rigs, scaffolding, fencing, cranes, dust and dirt, noise barriers or curtains, and storage of construction materials. Distant views of water and mountains might be somewhat cluttered by construction activities, and views up and down the corridor would

**Where can I learn more about mitigation for construction effects?**

This chapter first identifies construction effects. **Questions 23 and 24** of this chapter explain how mitigation plans will be developed and identify possible mitigation measures that could be implemented.

**What is a dBA?**

Sound levels are expressed on a logarithmic scale in units called decibels (dB). A-weighted decibels (dBA) are the commonly used frequency that measures sound at levels that people can hear.

To the human ear, a 1- to 3-dBA change is hard to distinguish, but a 5 dBA change in noise level is readily noticeable. A 10 dBA decrease would sound like the noise level has been cut in half.

**2006 Appendix F**

In the ***2006 Appendix F, Noise and Vibration Discipline Report,*** **Chapter 6** discusses the construction effects of noise and vibration.

**2006 Appendix D**

In the ***2006 Appendix D, Visual Quality Technical Memorandum,*** **Chapter 6** discusses the construction effects to views.

be cluttered or obstructed by construction materials, equipment, and activities. Views would be more affected during construction of the Elevated Structure Alternative than the Tunnel Alternative because most of the tunnel construction would occur underground instead of aboveground.

For the Tunnel and Elevated Structure Alternatives, the Partially Lowered Aurora improvements would require a larger construction area north of the Battery Street Tunnel compared to the Draft EIS Tunnel and Rebuild Alternatives. As a result, construction effects to views and neighborhood character would be more noticeable.

**How would other design choices affect views during construction?**

**North –** Widening the Battery Street Tunnel curves and building the Lowered Aurora improvements would extend the project's construction area. Specifically, widening the Battery Street Tunnel curves would require removing about half the lid over the Battery Street Tunnel in the Belltown neighborhood. This would expose much of the Battery Street Tunnel construction activities along Battery Street instead of keeping them out of view as proposed with the Battery Street Tunnel improvements.

Additionally, Lowered Aurora would extend the construction area three blocks farther north up to Comstock Street, affecting views and neighborhood character in a slightly larger area compared to Partially Lowered Aurora.

## 11 How would parks, recreation, and open space be affected during construction?

Construction effects from the alternatives would not differ much from the effects described in the Draft EIS. Construction effects would include noise, blocked and cluttered views, dust, traffic delays, and congestion. Construction would make it more difficult for people to make their way to parks and recreation facilities along the waterfront and to move around once they got there. Additionally, reduced numbers of parking spaces along the waterfront during construction and lane or roadway closures on Alaskan Way might discourage people arriving by car. These construction-related disruptions could keep some people away, and facilities that rely on an admission fee, such as the Seattle Aquarium, might be affected financially.

Partial to full closures of SR 99 to through traffic during construction wouldn't greatly affect parks and recreation facilities, which rely primarily on surface street access by pedestrians and vehicles.

## 12 How would neighborhoods be affected during construction?

Construction of the Tunnel and Elevated Structure Alternatives would inconvenience neighborhoods in ways similar to those discussed for the Tunnel and Rebuild Alternatives in the Draft EIS. Construction effects would include traffic detours, traffic congestion, noise and air pollution, and other less direct impacts. Construction along the corridor would temporarily increase the barrier—both perceived and physical—created by SR 99, and both alternatives include changes that would cause some new construction effects, occurring mostly in the north section of the project area.

Because the expanded north section is located in a mostly residential neighborhood, round-the-clock construction activities would affect noise, light, and glare and restrict access in a broader area than described in the Draft EIS. Businesses, government offices, and community services near the expanded corridor would also be affected.

**How would other design choices affect neighborhoods during construction?**

**North –** The Belltown neighborhood directly adjacent to the Battery Street Tunnel would be affected by the widening of the curves at both ends of the tunnel. This design choice would require about half of the lid over the Battery Street Tunnel to be removed for a 12- to 18-month period. During this time, temporary traffic detours would cause congestion and travel delays in much of Belltown, affecting residents, businesses, social services, community facilities, and cultural institutions.

The Lowered Aurora improvements would extend the project's construction area three blocks farther north than the Partially Lowered Aurora improvements, so the resulting construction activities would affect a larger portion of the surrounding neighborhood.

## 13 How would community and social services be affected during construction?

The Department of Social and Health Services has opened a new transitional housing facility in the south section. This facility might be affected by construction of either alternative. CASA Latina, which provides educational and employment opportunities for Latino immigrants, is planning to move from its location on Blanchard Street before project construction begins and would avoid potential construction effects described in the Draft EIS.

**How would other design choices affect community and social services during construction?**

**North –** Widening the Battery Street Tunnel curves at the tunnel's south end would require the Catholic Seamen's Club to be temporarily relocated, inconveniencing people who take advantage of the club's services and causing the loss of rental income generated by building tenants.

## 14 How would low-income populations be affected during construction?

Construction of either the Tunnel or Elevated Structure Alternative would affect these populations in much the same way that the Draft EIS Tunnel or Rebuild Alternatives would have, with traffic detours and congestion, increased transit travel times, loss of parking, construction noise, and the disruption of the day-to-day activities of neighborhoods.

As compared to the Draft EIS alternatives, these construction effects would be greater in neighborhoods north of the Battery Street Tunnel, where the Partially Lowered Aurora improvements would require a larg-

**What parks might be affected by construction?**

- Washington Street Boat Landing
- Victor Steinbrueck Park
- Waterfront Park
- Olympic Sculpture Park

**2006 Appendix H**

In the ***2006 Appendix H, Parks and Recreation Technical Memorandum,* Chapter 6** discusses the construction effects to parks and recreational areas.

**2006 Appendix I**

In the ***2006 Appendix I, Social Resources Technical Memorandum,* Chapter 6** discusses the construction effects to neighborhoods and social services.

**2006 Appendix J**

In the ***2006 Appendix J, Environmental Justice Technical Memorandum,* Chapter 6** discusses the construction effects related to environmental justice, which includes low-income and minority populations.

er construction area than the alternatives evaluated in the Draft EIS.

Because many parts of the project design are still under consideration, it's not possible yet to fully understand how construction might affect minorities, individuals and families with low incomes, and the services that many of these people rely on.

As part of the effort to forecast possible construction effects to these populations, we have held individual meetings with social service providers and public outreach meetings where people can find out about the project, express their opinions, and give input about the project. Additionally, we have studied how the project might affect people who supplement their food by fishing on the section of Seattle's waterfront that's in the project corridor.

The project partners will continue working to find ways to avoid or reduce construction-related effects on these populations through careful planning and design and by providing fair and thorough solutions to construction-related problems when they do occur.

## 15 How would historic properties be affected during construction?

Most of the construction effects for both alternatives would be the same as those described in the Draft EIS. As described in the Draft EIS, the Washington Street Boat Landing pergola would be removed during construction and replaced nearby once construction was completed. Additionally, some modifications of the basement of Fire Station No. 2 would be required to accommodate a new emergency exit from the Battery Street Tunnel.

As in the Draft EIS, several historic structures could be affected by vibration from construction activities, restricted loading dock access, loss of parking, and prolonged road closures. Reduced access during construction might cause the loss of the tenants and customers who make historic buildings profitable and help pay for their maintenance.

### How would other design choices affect historic properties during construction?

**North –** Widening the Battery Street Tunnel curves would require altering the foundation of the historic McGraw Kittenger Case (Blu Canary/MGM) Building.

## 16 How would the local and regional economy be affected during construction?

For both the Tunnel and Elevated Structure Alternatives, the number of businesses potentially affected by construction activities has increased since the Draft EIS was issued because of proposed improvements in and north of the Battery Street Tunnel. Approximately 1,200 businesses are located within one block of the existing SR 99 alignment, which is about 100 more businesses than the number identified in the Draft EIS. About 170 active businesses are located within 50 feet of the project's construction limits. These businesses are likely to be affected by construction activities in different ways. Some businesses may be periodically disturbed by construction activities and detours, while others, such as those located along the waterfront, may suffer a decline in revenue if people choose to avoid the area during construction. It is likely that restaurants, retail stores, and tourist-related businesses on the west side of the waterfront would be the most affected businesses in the corridor. The project partners recognize that construction will be tough for many businesses located near the construction area. Construction effects to businesses in the project area are an important consideration for the project partners as we work to determine how the project would be built.

Potential construction effects to businesses from traffic restrictions and closures, congestion, noise, dust, and changes to access would vary throughout the construction period. Traffic detours and road closures could make it harder for customers and employees to reach businesses, and for goods and services to be distributed. The amount of time SR 99 would be restricted or closed varies between the construction plans and alternatives. When SR 99 is restricted or closed, congestion would increase on local streets and I-5, making it more difficult for customers and employees to reach businesses and for goods and services to be distributed. Congestion on local streets and I-5 would increase the most when SR 99 is closed. However, closing SR 99 for a longer period of time would reduce the total time it takes to build the project, which would lessen the length of time businesses would be affected.

Specific detour routes identified with construction plans take traffic directly off of SR 99 and connect it back to SR 99. For the Elevated Structure Alternative with the longer construction plan, the First Avenue S. Detour would be in place for 27 months. Additionally, First Avenue S. would be used as an alternate route for both alternatives throughout construction, but particularly when SR 99 is closed. Businesses located on First Avenue S. could be affected by increased congestion and reduced parking during construction. Similarly, for the Elevated Structure Alternative, the Broad Street Detour would affect businesses, increase congestion, and reduce parking along Broad Street for a 51-month period during construction.

Construction activities, especially along the central waterfront, would interfere with access to businesses and properties adjacent to the project on both sides of the right-of-way. A primary goal of construction planning is to maintain adequate access to all businesses so they can continue to operate. As construction phasing is refined in the coming months, it may be determined on a case-by-case basis that it is not reasonable or feasible to maintain access to some businesses. To help maintain pedestrian access along the waterfront during construction, we are considering the feasibility of constructing temporary over-water pedestrian walkways between some piers. If adequate access cannot be maintained, impacts to affected businesses will be mitigated under policies to be identified in the project's Business Mitigation Plan. If the provisions of the Uniform Relocation Act are met, then relocation assistance would be provided.

### Economic Benefits

Some sectors of the economy, such as contractors and construction material providers, would benefit from the dollars being invested to build the project. The

**2006 Appendix L**

In the ***2006 Appendix L, Historic Resources Technical Memorandum,*** **Chapter 6** discusses construction effects to historic resources.

Historic resources that might be affected by the project are included in the **Section 4(f) Evaluation** found on page 117. The **Section 4(f)** attachments (Parts A, B, C, and D) are provided in the ***2006 Appendix N***.

**2006 Appendix P**

In the ***2006 Appendix P, Economics Technical Memorandum,*** **Chapter 6** discusses the construction effects to the economy.

construction dollars entering the economy to build this project would add tax revenue, wages, and new economic activity to the area. The Tunnel Alternative would have a greater local and regional economic benefit during construction because of the additional workers and tax revenue that it would generate.

Construction employment would result in additional activity throughout all the economic sectors in the Puget Sound region. The average number of jobs needed to construct the Tunnel Alternative under the intermediate plan is estimated to range between 1,085 and 1,125 jobs per year, adding about $112 million in wages per year. The average number of jobs needed to build the Elevated Structure Alternative under the longer construction plan would be about 670 jobs per year, adding about $67 million in wages per year. Sales tax generated from the purchase of goods and materials related to construction is estimated to be $223 million for Tunnel Alternative and $141 million for the Elevated Structure Alternative. Sales tax estimates are based on the overall construction costs for the project, not including project development and right-of way costs. In addition, the influx of construction dollars is estimated to contribute an additional $132 million to $137 million to the Puget Sound regional economy over the total construction period. This indirect benefit to the regional economy would come from wages generated by new jobs created in addition to those directly required for construction.

### Construction Effects to Parking

There are approximately 3,703 parking spaces located within the project's construction area, as shown in Exhibit 7-16. During construction, both alternatives would remove all of the spaces in the area shown on Exhibit 7-17, which would affect local businesses.

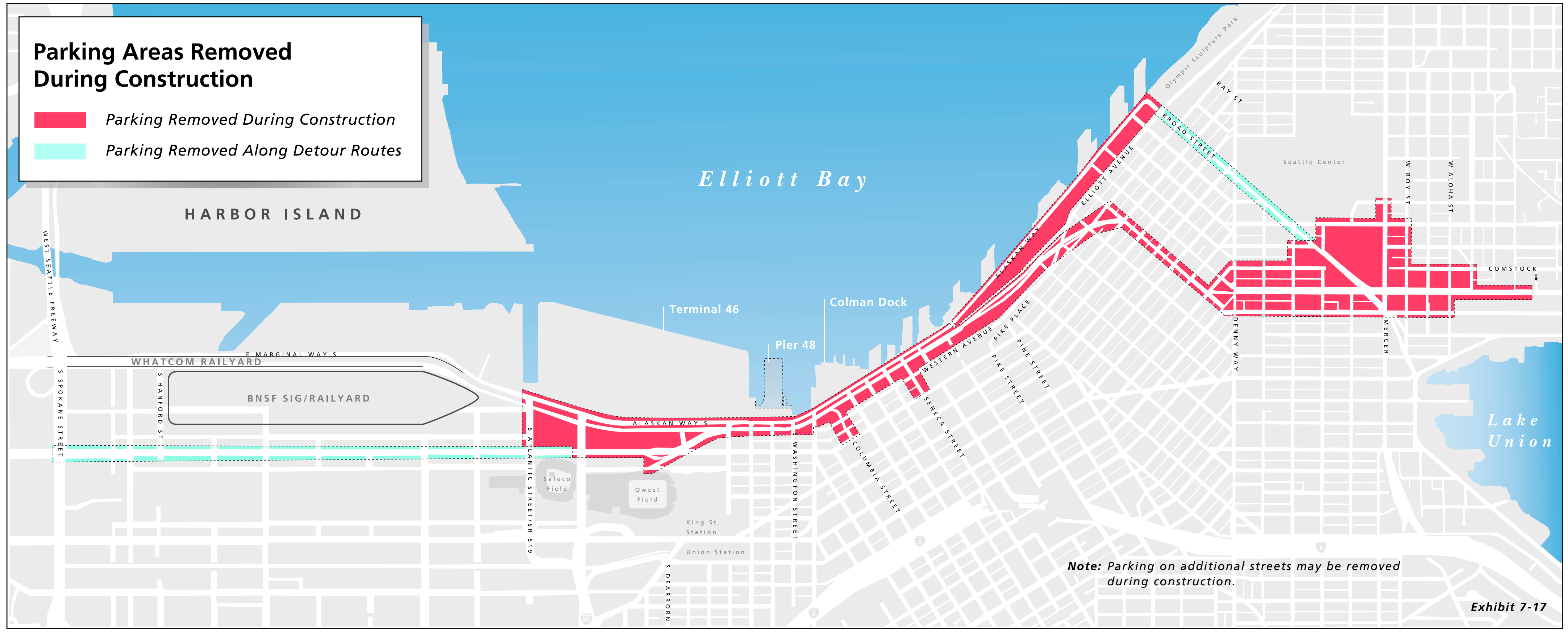



Exhibit 7-17

*Exhibit 7-16*

**Parking Removed during Construction of Either Alternative**

| | South | Central | North Waterfront | North | Total |
|---|---|---|---|---|---|
| On-Street[1] Parking Spaces | 516 | 626 | 185 | 319 | 1,360 |
| Off-Street Parking Spaces | 844 | 770 | 0 | 443 | 2,057 |
| Total | 1,360 | 1,396 | 185 | 762 | 3,703 |

[1] *On-street parking includes both short-term and long-term spaces.*

*Note: The estimated number of parking spaces removed during construction does not include parking spaces along detour routes.*

In addition, parking spaces along detour routes outside of the project's construction area would also be removed. The Broad Street Detour is estimated to remove approximately 40 on-street short-term spaces, and the First Avenue S. Detour would remove approximately 325 on-street short-term spaces. Most of these spaces are not metered but are signed with 1- or 2-hour limits. It's likely that parking on city streets such as First, Second, and Fourth Avenues would also be removed during construction; however, the extent and location of spaces removed is unknown at this time.

The number of parking spaces required during construction has increased compared to the Draft EIS due to the proposed improvements north of the Battery Street Tunnel, project design changes, and updated parking counts. The Pioneer Square, central waterfront, and commercial core business districts rely upon short-term metered parking, so the loss of close parking and increase in traffic congestion could deter customers and cause a loss in business. The City would lose revenue from metered parking during each year SR 99 is under construction.

Up to 2,000 parking spaces could be required during the height of construction to accommodate construction workers during the short period of time when the workers' shifts overlap. Less parking for construction workers would be needed when only one shift is on duty.

**2004 Appendix C**

***2004 Appendix C, Transportation Discipline Report*, Section 6.3.6** provides additional information on parking.

**What is on-street parking?**

There are two types of on-street parking, short-term and long-term. On-street short-term parking includes metered spaces, time-restricted public parking spaces (such as 1-hour parking and loading zones), bus/taxi zones, and spaces reserved for police parking. On-street long-term parking includes unmetered, unrestricted on-street public parking spaces.

### 17 How would public services and utilities be affected during construction?

The Tunnel and Elevated Structure Alternatives would affect public services in similar ways. Traffic delays are expected to occur throughout construction under any of the construction plans. Roadway restrictions and closures on SR 99 would cause increased traffic delays and congestion on roads both in and near the project area, potentially increasing response times for emergency services like police, fire crews, and medical aid. Emergency service providers would be informed of all closures and detours ahead of time. Non-emergency services would be affected as well, including trash removal and recycling, mail delivery, and school buses.

As previously described in the Draft EIS, Fire Station No. 5, located next to Colman Dock on the waterfront, would be relocated for some portion of the construction period for either alternative. The project partners will work with the Seattle Fire Department to ensure that both water- and land-based fire services find an acceptable location.

North of the Battery Street Tunnel, the Tunnel and Elevated Structure Alternatives would require lane closures during construction that could affect response times for both emergency and non-emergency services, such as Fire Station No. 2 and possibly Fire Station No. 8.

Both alternatives would require relocating utilities throughout the project area. The estimate of time needed to relocate utilities in the first construction stage has increased by 12 months, as compared to the Draft EIS. During construction, temporary power poles may be needed on both sides of the Alaskan Way surface street. Project planners are working with utility service providers to minimize disruptions and interruptions relocating utilities.

Electric and magnetic fields (EMFs) surround electric power lines, electric wiring, and equipment. Research on whether exposure to EMFs can lead to adverse impacts on human health has been underway for many years. In the urban environment, such as the AWV Project area, power lines can be located fairly close to residences and work places. EMFs are considered in the planning and design of new electrical facilities. To address such a concern, Seattle City Light maintains a policy of evaluating measures to reduce EMFs in the design of new facilities and will do so in determining the best solutions for power line relocation for the project. Seattle City Light routinely provides information on EMFs and the electrical system. As questions and concerns arise, Seattle City Light also provides information on possible health effects.[2]

#### How would other design choices affect public services and utilities during construction?

**Central –** A side-by-side tunnel along the central waterfront would require building a much wider structure underground along the waterfront. This would restrict the available area where utilities could be placed in the corridor, and in certain cases it could require some utilities to be relocated to other areas, which could be more expensive and/or more disruptive. This is one of the important benefits of building a stacked tunnel along the central waterfront. A stacked tunnel would provide much more space for utilities to be stored. Currently, areas under the existing viaduct and Alaskan Way surface street carry many important utilities, such as power lines, water, stormwater, sewer lines, telecommunications, and steam. These utilities provide important services to downtown and areas beyond downtown. Specifically, the power lines contained in this area not only serve downtown, but they are also a critical link in the west coast's regional power grid.

**North –** If the Lowered Aurora improvements are chosen, the project's north construction boundaries would expand northward to include the area that is served by Fire Station No. 8, possibly increasing response times during construction as compared to Partially Lowered Aurora. However, response times for Fire Station No. 2 would be the same for both alternatives. Extending the project boundaries to the north would also cause more overall effects to utilities than the Partially Lowered Aurora improvements would, because excavation for the project would extend farther north.

### 18 How would air quality be affected during construction?

The effects of construction on air quality would be similar to those described in the Draft EIS, which included the Broad Street Detour. The effects would be experienced along a broader area than described in the Draft EIS due to a possible detour on First Avenue S. and improvements proposed farther north of the Battery Street Tunnel. Dust from construction excavation and demolition activities would affect air quality directly adjacent to the construction area.

### 19 How would fish and aquatic habitat be affected during construction?

The construction effects to fish and aquatic habitat would be similar to those described in the Draft EIS with some changes, primarily to the amount of habitat affected. As described in the Draft EIS, potential effects during construction for the Tunnel and the Elevated Structure Alternatives could occur from in-water construction activities, in-water pile placement, over-water construction staging (including materials handling), erosion from construction areas, dewatering, and soil improvements.

Both the Tunnel and Elevated Structure Alternatives would now build a temporary rather than a permanent over-water ferry access bridge between Pier 48 and Colman Dock. The temporary bridge would be built sometime during the first 30 months of construction, and it would remain until construction is completed. The bridge would temporarily shade approximately 15,000 square feet of shallow subtidal habitat. This effect is much less than described in the Draft EIS, where the Tunnel and Rebuild Alternatives would have built a new pier that would have permanently shaded approximately 29,000 or 33,000 square feet, respectively. Additionally, to help maintain pedestrian access along the waterfront during construction, the project partners are considering the feasibility of constructing temporary over-water pedestrian walkways between some piers.

**What is off-street parking?**

Off-street parking includes parking garages and lots where people pay to park. Most off-street parking is privately owned or operated.

**2006 Appendix O**

In the ***2006 Appendix O, Public Services and Utilities Technical Memorandum***, **Chapter 6** discusses the construction effects to public services and utilities.

**2006 Appendix Q**

In the ***2006 Appendix Q, Air Quality Discipline Report***, **Chapter 6** discusses the construction effects to air quality.

**2006 Appendix R**

In the ***2006 Appendix R, Fisheries, Wildlife and Habitat Report***, **Chapter 6** discusses the construction effects to fish and aquatic habitat.

[2] Seattle City Light 2005.

A temporary sheet pile wall, silt curtain, or equivalent measure would be installed where feasible along active work areas to protect water quality in Elliott Bay during construction. This is a slight change from the Draft EIS, which proposed to install a silt curtain but did not include a temporary sheet pile wall. Sheet pile walls would be installed by vibrating the wall into place rather than hammering panels in place. This technique would help minimize effects to aquatic life. Silt curtains might be placed in areas where sheet pile walls are not practical, such as underneath the piers. Bottom sediments, which could be contaminated, could be temporarily disturbed during installation of the sheet pile wall and if riprap is removed. In-water construction work would be restricted during the major portion of the juvenile salmon migration period that lasts for several months in the spring and early summer.

## 20 How would water resources be affected during construction?

Potential effects to water quality during construction would be similar to those described in the Draft EIS. Water quality could be affected by in-water work, over-water construction staging (including materials handling), erosion, dewatering, and soil improvements. Best management practices (BMPs) will be used and implemented during construction to prevent discharges into receiving water bodies.

As described in the fish and aquatic effects section (Question 19), a temporary sheet pile wall (or equivalent protection measure) would be installed along active work areas to protect water quality in Elliott Bay during construction. Temporary turbidity could result from disturbing the bottom sediments, which could be contaminated.

Soil improvements, drilled shafts, and slurry wall construction would create spoils (the soil and other material displaced during the construction activities) that contain mostly water. This water could have a high pH, which could harm fish and aquatic habitat if it is directly discharged into Elliott Bay. If the pH is high, the water would be treated to decrease the pH before it is discharged. The amount of spoils anticipated for each alternative from these activities is shown in Exhibit 7-18.

*Exhibit 7-18*

**Amounts of Spoils Compared to Draft EIS**

*cubic yards*

| | Supplemental Draft EIS | Draft EIS |
|---|---|---|
| *Tunnel Alternative* | *492,000* | *241,000* |
| *Elevated Structure Alternative* | *507,000* | |
| *Rebuild Alternative* | | *256,000* |
| *Aerial Alternative* | | *286,000* |

The total volume of spoils is greater than what was discussed for the Draft EIS Tunnel, Rebuild, and Aerial Alternatives because of the larger area of soil improvements required in the south and north sections of the project area. The Elevated Structure Alternative is expected to have a slightly higher volume of spoils compared to the Tunnel Alternative because a larger area of soil behind the seawall would be strengthened by soil improvements. For the Tunnel Alternative, much of the soil behind the seawall would be removed, so less spoils would be generated from soil improvements.

A new temporary over-water bridge for ferry access would be constructed between Pier 48 and Colman Dock. Stormwater runoff from the temporary bridge would be collected and treated with temporary stormwater BMPs to minimize or prevent impacts to Elliott Bay.

Construction in the north section could also result in new temporary construction impacts to water quality. Excavating the trench to construct the Partially Lowered Aurora improvements could require minor dewatering. This dewatering water could contain pollutants. Treatment would be provided as needed to protect water quality before discharging water to Lake Union using a new temporary outfall, or the water could be collected, treated, and hauled off-site.

Construction effects to water quality would be the same for both the Tunnel and Elevated Structure Alternatives. However, the length of time when effects could occur depends on the construction plan chosen. Having a shorter window of time when potential spills could occur and construction equipment is operating would reduce the number of rainy seasons when construction is taking place, which would reduce the risk of construction effects to water quality.

Construction of the AWV Project would involve disturbing and rebuilding portions of the City's and King County's existing combined sewer and separated storm drainage systems within the project area. The replacement drainage systems within the project area will be designed to support implementation of the City's and County's long-term combined sewer overflow control plans. Both the City's and County's combined sewer overflow control plans would likely be affected by the AWV Project, both in terms of timing and configuration. Therefore, the City's and County's combined sewer overflow control efforts may be considered an interrelated but independent project. The portions of the drainage system that are replaced by the AWV Project will be designed not to degrade existing water quality conditions within the project area.

### How would other design choices affect water resources during construction?

**South –** The Relocated Whatcom Railyard would create approximately 26,000 fewer cubic yards of spoils than the Reconfigured Whatcom Railyard because SR 99 would be at-grade and would not have to bridge over the railroad tracks.

**Central –** The side-by-side tunnel would generate approximately 23,000 more cubic yards of spoils than a stacked tunnel. The Steinbrueck Park Lid would create about 2,000 more cubic yards of spoils than the Steinbrueck Park Walkway.

**North –** Excavating the trench to construct the Lowered Aurora improvements could require minor dewatering, as described for the Partially Lowered Aurora improvements. Widening the Battery Street Tunnel curves and building Lowered Aurora would create about 109,000 more cubic yards of spoils than the Battery Street Tunnel improvements and Partially Lowered Aurora.

**What is a BMP?**

A best management practice (BMP) is an action or structure that prevents or reduces pollution entering the stormwater or treats stormwater to reduce possible degradation of water quality.

**2006 Appendix S**

In the ***2006 Appendix S, Water Resources Discipline Report,*** **Chapter 6** discusses the construction effects to water resources.

**What is a combined sewer system?**

Combined sewers carry sewage from homes and businesses in the same pipe with stormwater. Under normal conditions these systems carry untreated sewage and stormwater to a treatment plant where the water is treated prior to being discharged. When rainfall volumes exceed pipe capacity, the combined system overflows and water is discharged via outfalls directly to Puget Sound without being treated at a treatment plant.

## 21 How would soil and contaminated materials be affected during construction?

The alternatives would not create any new contaminated materials or sites. The construction effects for soil and hazardous materials would be similar to those described in the Draft EIS, but the excavation quantities for both alternatives have increased because of the addition of the improvements north of the Battery Street Tunnel and because most of the material to be excavated along the waterfront is now assumed to contain wood debris, which means it must be handled like contaminated material or a problem waste.

Exhibit 7-19 compares the total estimated volume of soil and potentially contaminated material to be excvated for the Tunnel and Elevated Structure Alternatives. The soil excavation volumes include construction spoils shown previously in Exhibit 7-18. Removal of contaminated soil could reduce future groundwater contamination and reduce the risk of exposure to contaminated soil for workers servicing underground utilities.

*Exhibit 7-19*

**Estimated Volume of Excavated and Contaminated Material for the Alternatives**

*cubic yards*

| | Excavated Material | Potentially Contaminated Material |
|---|---|---|
| *Tunnel Alternative* | *2,567,000* | *1,866,000* |
| *Elevated Structure Alternative* | *1,313,000* | *1,111,000* |

In 2004 and 2005, additional soil and groundwater samples were collected throughout the project area, including the area north of the Battery Street Tunnel where the project area has been extended. Soil and groundwater contamination are present within the right-of-way and on many adjacent properties north of the Battery Street Tunnel.

The types of contamination most commonly found north of the Battery Street Tunnel are gasoline, petroleum (diesel), and solvents. Gasoline contamination is often associated with old gas stations. Petroleum also leaks into the ground from gas stations and automobile repair shops. Solvents are often found at dry cleaning businesses and are also used as grease removers at mechanic shops.

There are six general types of contamination in the project area:

- **Oil** (mid- to heavy-range petroleum hydrocarbons)
- **Gasoline**
- **Metals** (such as arsenic, chromium, lead, and mercury)
- **Solvents** (such as trichloroethylene [TCE] and tetrachloroethylene [PCE])
- **Polychlorinated biphenyls** (PCBs)
- **Polynuclear aromatic hydrocarbons** (PAHs) (associated with oil and creosote-treated timbers)

In addition to these contaminants, the 2004 and 2005 sampling identified wood debris in 41 percent of the samples collected from fill in the south project area, 47 percent of the samples collected from fill along the central section up to Stewart Street, and 22 percent of the samples collected from Stewart Street up to the Battery Street Tunnel. The estimated volume of contaminated soils in Exhibit 7-19 includes wood debris, which consists of creosote-treated timber, existing rail ballast, ties, and other obstructions. It may not be practical to separate the wood debris from the soil along the central waterfront. If the soil contains more than 5 percent wood debris, it would need to be transported to a solid waste landfill that is permitted to accept wood debris, including creosote-treated piles.

### How would other design choices affect the estimated volume of excavated and contaminated material?

The different choices would increase or decrease the total volume of excavated and contaminated material by the amounts shown in Exhibit 7-20.

*Exhibit 7-20*

**Difference in the Amount of Excavated and Contaminated Material for the Design Choices**

*cubic yards*

| | Excavated Material | Potentially Contaminated Material |
|---|---|---|
| *Relocated Whatcom Railyard* | *+94,000* | *+94,000* |
| *Side-by-Side Tunnel* | *+186,000* | *+254,000* |
| *SR 99 over Elliott & Western (for the Tunnel)* | *-165,000* | *-31,000* |
| *Steinbrueck Park Lid* | *+2,000* | *+2,000* |
| *Battery Street Tunnel with Widened Curves and Lowered Aurora* | *+637,000 to +657,000* | *+347,000 to +377,000* |

## 22 Would construction affect archaeological resources?

Construction of either alternative would have similar potential effects to archaeological resources as described for the Tunnel and Rebuild Alternatives in the Draft EIS. Excavation, pile-driving activities, drilled shaft construction, tunnel wall construction, and soil improvement work could all potentially disturb archaeological resources. Any historically significant discoveries encountered during construction would be subject to provisions under Section 4(f).

## 23 How would we develop construction mitigation plans for the project?

The Draft EIS and this Supplemental Draft EIS present menus of potential measures that could be used to mitigate negative project effects. After reviewing public and agency comments on both documents, the project team will prepare more specific mitigation measures to address identified construction effects. Opportunities for public and agency review of many mitigation elements will be provided. The project partners will finalize the list of mitigation measures and commit to their implementation in the Final EIS and the Record of Decision issued by FHWA.

Some of these mitigation measures will be included in the formal mitigation plans. These plans include construction transportation management (including parking); noise; business and residential mitigation; Section 106 and historic and cultural resources; and fish, aquatic resources, and water quality.

**2006 Appendix U**

In the ***2006 Appendix U, Hazardous Materials Discipline Report*, Chapter 6** discusses the construction effects for hazardous materials.

Descriptions and maps showing contamination sites in the project area are included in **Chapters 3** and **4** of ***Appendix U.***

**2006 Appendix M**

The ***2006 Appendix M, Archaeological Resources and Traditional Cultural Places Technical Memorandum,*** *discusses possible construction effects to archaeological resources.*

Mitigation measures and plans will be developed by considering effects to adjacent and nearby properties in terms of severity and length of effects. The mitigation measures and plans will be tailored to the various construction stages and varying levels of effect over time as appropriate. The following paragraphs discuss in more detail the proposed mitigation plans.

**Construction Transportation Management Plan (Including Parking)**

A draft Construction Transportation Management Plan will be prepared and included in the Final EIS. The plan will address a number of elements, including transit, traffic operations, traveler information, freight, emergency response, strategies to manage transportation demand, and parking. An extensive public review and involvement process is planned during the coming months so that public comments can be taken into account as the project partners identify mitigation commitments in the Final EIS.

**Noise Plan**

Construction noise mitigation will be developed through the City of Seattle's noise variance process. The project partners will prepare a draft noise variance application for the Preferred Alternative that will contain specific mitigation measures. This draft application will then go through an intensive public input and review process in 2007. The project partners will revise the application, including the mitigation measures, based on this input and formally submit the application to the City of Seattle Department of Planning and Development later in 2007. The mitigation measures included in the formal application will also be included in the AWV Project's Final EIS. The Department of Planning and Development will then do an independent analysis of the application and present the studies and mitigation to the public for another review and comment period. After this second public review, the Department of Planning and Development will make a determination on finalizing the variance. It would not be issued until after the project's Final EIS is issued.

**Business and Residential Mitigation Plans**

A Business Mitigation Plan will be developed to mitigate the impacts associated with construction of the project on the businesses within the area of immediate impacts as well as on those businesses that are indirectly affected due to the displacement of traffic from the SR 99 corridor. The plan will build on the identified effects and mitigation measures for other disciplines, including air quality, noise, economics, land use, and transportation and parking. The plan will address general business issues such as access to downtown Seattle and specific areas such as the central waterfront and Pioneer Square. Over time, the plan will be fine-tuned to address specific businesses with unique characteristics (such as water-dependent businesses along the central waterfront). Elements of the plan will be reviewed with representative stakeholders over the next year. The Business Mitigation Plan, reflecting this input, will be included in the Final EIS.

Likewise, a Residential Mitigation Plan will be prepared to consolidate in one location the mitigation measures developed to mitigate construction impacts on residences located within the area of immediate impacts. The major issues identified include access, parking, noise, and air quality (dust).

**Section 106 and Historic and Cultural Resources**

Section 106 of the National Historic Preservation Act requires agencies to consider the effects of federal actions on historic properties. The project team will continue to consult with the State Historic Preservation Officer (SHPO), tribes, and other interested parties in the development of mitigation measures.
We will:

- Develop agreements to address how we will deal with known and unknown effects to historic and cultural resources. Any historically significant discoveries encountered during construction would be subject to provisions under Section 4(f).
- Develop resource-specific Memoranda of Agreement to document and mitigate effects. The project has already begun to develop documentation for known historic effects to the viaduct, seawall, and the Washington Street Boat Landing. Additionally, the project partners are conducting in-depth archaeological studies of the area to better understand where cultural sites or sensitive cultural resources may be located.

Depending on the type of resource, mitigation of adverse construction effects can involve documentation, excavation, and/or relocation. Other appropriate measures will be developed on a case-by-case basis with the SHPO. When the parties agree on how the adverse impacts will be resolved, a Memorandum of Agreement will be signed and implemented. This agreement will outline mitigation measures, identify responsible parties, and bind the signatories. In consultation with the SHPO and tribes, the project team will also develop an inadvertent discovery protocol and construction monitoring plan. The Section 106 documentation will be included in the Final EIS.

**Fish, Aquatic Resources, and Water Quality**

An Aquatic Resource Mitigation Plan will be developed to address construction-related effects to Elliott Bay habitat and water resources. This plan will be reviewed by regulatory agencies for concurrence before it is finalized and included in the Final EIS. During the permitting and design processes, a Temporary Erosion and Sediment Control Plan, a Spill Containment and Countermeasures Plan, and a Surface Water Pollution Prevention Plan will be developed for the project to ensure that pollutants (including sediment) associated with active construction sites and staging areas are controlled and that temporary impacts to water quality are minimized or prevented.

Mitigation measures and plans will continue to be updated and compliance will be monitored throughout the life of the project. A key component of all of the plans is an intensive and interactive communications strategy, including a construction information line, rapid response to and resolution of problems identified through the information line and other sources, and frequent communications with businesses and residences affected by construction activities.

## 24 What types of mitigation measures could be utilized to minimize construction effects?

### Noise

The long construction duration and unique nature of this project would likely require a technical or other appropriate noise variance from the City of Seattle. Obtaining a technical variance includes a public hearing process and requires the applicant to abide by noise mitigation measures set forth by the City.

The following mitigation measures could be incorporated into the construction plans, contractor specifications, and variance requirements:

- Develop a construction noise management and monitoring plan that establishes specific noise level limits during specific time periods.
- Crush and recycle concrete off-site away from noise-sensitive uses.
- Put temporary noise barriers or curtains around equipment and work areas and use adequate mufflers or intake silencers. This could reduce noise by 5 to 10 dBA.
- Require contractors to use agency-approved ambient sound-level-sensing backup alarms.
- Provide a 24-hour noise complaint line and complaint resolution process.

Additional measures are described in **Section 8.2** of the *2004 Appendix F, Noise and Vibration Discipline Report*.

### Vibration

Pile driving would be the main source of vibration during construction. Potential measures to reduce vibration impacts from pile driving include methods such as jetting, predrilling, cast-in-place or auger piles, pile cushioning, or other methods. Detailed descriptions of these measures are in **Section 8.3** of the *2004 Appendix F, Noise and Vibration Discipline Report*.

Vibration from other construction and demolition activities could be reduced by restricting operation to a distance away from historic structures or using alternative construction equipment or methods. Vibration monitoring would be required at the nearest historic structure or sensitive receiver to the construction activities to ensure that the vibration levels do not exceed the damage risk criteria for historic and non-historic buildings.

### Views

Construction mitigation generally is of limited effectiveness in addressing the general disruption of the views and overall character of neighborhoods during construction. Mitigation measures that might be taken include the following:

- Shield lighting required for nighttime construction to prevent light overspill into residential areas.
- Ensure that construction crews comply with all specifications and regulations related to dust control, site cleanup, and storage of materials and equipment.
- Erect visual screens, such as fabric over construction fencing, to limit views of construction activities. For example, using such a screen on the east side of waterfront businesses would tend to focus visitors in that area toward scenic waterfront views. Construction barriers can incorporate pedestrian-oriented murals or other graphic interest.
- Some construction activities are likely to be once-in-a-lifetime occurrences and may provide visual interest. To encourage construction viewing, construction observation areas with displays and updates on project progress could be provided.
- Restore the construction corridor where construction has been completed in intermediate stages rather than waiting until the project is completed.

### Parks and Recreation

Mitigation of construction effects on parks and recreation facilities could include the following:

- Provide facilities outside the corridor that would temporarily replace in-corridor facilities affected by things like noise and vibration.
- Reschedule programs, such as concerts, to times when construction produces less noise, or reschedule construction activities.
- Identify methods that would reduce noise and vibration during construction, especially around sensitive areas like the Seattle Aquarium.
- Consider temporarily relocating parts of the Seattle Aquarium animal collection during times or seasons when animals are especially sensitive, or during the periods of highest construction noise and vibration.
- Keep the public informed of activities along the waterfront, and tell them how to make their way to and around the corridor during construction.
- Build temporary pedestrian corridors along both the east and west sides of the construction zone.

Additional descriptions of mitigation measures can be found in **Chapter 9** of the *2004 Appendix H, Parks and Recreation Technical Memorandum*.

### Neighborhoods and Community and Social Services

Mitigation of construction-related effects on neighborhoods and community and social services could include the following:

- Minimize construction-related effects like noise, dust, light and glare, especially from nighttime work.
- Minimize construction-related effects on parking, such as restricted access and reduced parking.
- When possible, restrict construction that generates noise and vibration to daylight hours.
- Develop alternative travel routes to provide access to services during construction.
- Find alternative parking areas for businesses and community and social services whose regular parking spots are not accessible.
- Communicate with communities as well as providers and patrons of community and social services to ensure they understand construction extent, construction scheduling, how to navigate around construction sites, and what services are offered to them as part of construction mitigation.

Additional mitigation measures are identified in **Chapter 9** of the *2004 Appendix I, Social Resources Techanical Memorandum.*

**Relocations, Businesses, and Parking**

Right-of-way acquisition and potential relocations will occur prior to construction stages. Property owners on adjacent parcels will be given advance notice of relocation or demolition activities that may occur during construction. Temporary access will be provided to local parcels during construction activities. If adequate access cannot be maintained, impacts to affected businesses will be mitigated under the policies to be identified in the project's Business Mitigation Plan. If the provisions of the Uniform Relocation Act are met, then relocation assistance would be provided.

Possible business mitigation measures include the following:

- Conduct a public information campaign.
- Provide lighting, signage, or other information.
- Maintain vehicle and pedestrian access during important business seasons and minimize the duration of modified or lost access.
- Implement measures to reduce noise, dust, and vibration.
- Provide mitigation for losses to short-term parking.

Additional measures are described in **Chapter 9** of both the *2004 and 2006 Appendix P, Economics Technical Memorandum.*

Some of the strategies in the Construction Transportation Management Plan could have economic components that would help mitigate effects during construction, such as:

- Expanding arterial flow map coverage to include key truck routes.

Reduced parking could be offset by implementing any of the following mitigation strategies during construction:

- Increase the use of other existing parking facilities in the area.
- Lease all or a portion of an existing parking facility and convert it to short-term parking.
- Facilitate or provide incentives for off-street parking lot operators to convert a percentage of their spaces to either short-term or long-term metered parking spaces.
- Purchase property and build a new short-term parking structure.

Economic mitigation strategies for other types of impacts to businesses during construction are being developed and will be presented in the Business Mitigation Plan. The Business Mitigation Plan will evolve over time, starting at the corridor level with a master list of potential mitigation measures (similar to that contained in the Draft EIS). Those measures will then be matched with specific impacts by business district (SODO, Pioneer Square, central waterfront, etc.). Finally, as construction nears, the plan will be fine-tuned by phase and specific business/facility impacts and location.

**Historic Resources**

Construction impacts are generally similar for both alternatives. Mitigating measures could include the following:

- Reduce the construction period, adjust the staging of construction to reduce construction impacts, and schedule construction in key areas such as Pioneer Square to minimize impacts on tourism and peak shopping periods.
- Provide assistance to the most heavily affected building owners or businesses in historic buildings to ensure their continued ability to maintain the structure properly.
- Provide a contingency fund to repair damage to historic buildings that occurs due to construction.
- Minimize construction traffic in historic areas.
- Provide clear detours and alternate routes and avoid, whenever possible, placing detour routes through historic areas.

Additional descriptions of mitigation measures can be found in **Chapter 9** of the *2004 Appendix L, Historic Resources Technical Memorandum*.

**Public Services and Utilities**

The *2004 Draft EIS Appendix O, Public Services and Utilities Technical Memorandum*, outlined potential mitigation measures that could reduce the potential impacts of the alternatives on utility services and infrastructure. The list included the following potential mitigation measures:

- Design the alternatives to avoid or at least to minimize impacts to utilities.
- Coordinate with Seattle Public Utilities and Seattle City Light to develop a Customer Service Plan. The plan will serve to notify utility customers of planned service disruptions, including fire service relocations, retirements, and/or new service requests.
- Where feasible, relocate utilities prior to roadway construction to avoid potential operational impacts.
- To minimize impacts of service disruptions, establish temporary connections to customers before relocating utility conveyances.
- Use construction techniques (e.g., drilled shafts versus driven piles) to avoid and/or minimize vibration impacts to utilities.
- Maintain water supply and vehicle access for emergency services during construction.
- Coordinate construction-related mitigation with other major projects in the vicinity, such as Sound Transit Central Link light rail, to minimize utility and traffic disruptions.

In *2006, the Supplemental Draft EIS Appendix O* was updated to include the following new measures:

- Prepare a consolidated utility relocation plan for both short-term and long-term relocations. The plan will include existing, temporary, and new locations for utilities; the sequence and schedules for utility work; and a detailed description of service disruptions.
- Coordinate with utility providers to ensure understanding and agreement about service outages, including schedules, sequencing, and the area in which outages would occur.
- Develop a Coordinated Utility Communication Plan to help coordinate providing reliable services to customers, and minimize and/or avoid temporary disconnections when utility lines are relocated. The plan will specify limits on utility shutdowns as specified by the utility service providers.

Additional descriptions of mitigation measures can be found in both the *2004 and 2006 Appendix O, Public Services and Utilities Technical Memorandum.* See **Chapter 4** for **public services** and **Chapter 5** for **utilities.**

### Air Quality

Possible mitigation measures to control emission and deposition of particulate matter and emissions of carbon monoxide and nitrogen oxides during construction include the following:

- Develop a detailed construction air pollutant emission control plan, possibly supported by particulate monitoring; pollutant emissions during construction could be substantially reduced by specifying project-specific techniques to be used by the contractor.
- Spray exposed soil with water or another dust-calming substance to reduce emission and deposition of particulate matter.
- Cover all trucks transporting materials, wet materials in trucks, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce deposition of particulate matter during transportation.
- Provide wheel washers to remove particulate matter that vehicles would otherwise carry offsite to decrease deposition of particulate matter on area roadways.
- Remove particulate matter deposited on paved, public roads to reduce mud and resultant windblown dust on area roadways.
- Route and schedule construction trucks to reduce delays to traffic during peak travel times in order to reduce secondary air quality impacts caused by a reduction in traffic speeds while waiting for construction trucks.

Additional measures are listed in **Section 9.2** of the *2004 Appendix Q, Air Quality Discipline Report*.

### Fish, Aquatic Resources, and Water Quality

To mitigate effects to fish, aquatic habitat, and water quality during construction, appropriate measures will be implemented. Elliott Bay will be protected from debris and work on the seawall by implementing BMPs such as placing a sheet pile wall, silt curtain, and/or debris boom around the work area and containing runoff within the curbs of the upland area. Runoff will be treated prior to discharge. Potentially contaminated spoils will be tested and disposed of at appropriate upland facilities. Erosion will be controlled in disturbed areas by implementing BMPs such as the following:

- Install silt dams and catchments.
- Install temporary sheet pile walls, silt curtains, or an equivalent measure to contain in-water construction.
- Conduct refueling activities within designated areas. Spill control measures will be developed and implemented as appropriate. Emergency response plans will be developed for fueling and concrete preparation activity areas.

Construction will disturb soil, which could result in turbid stormwater runoff. Dewatering during excavations could also contain pollutants. Treatment of stormwater runoff or dewatering water would be provided as needed to protect water quality before discharging it. Once the water is treated, it could be discharged to Elliott Bay or Lake Union using a temporary outfall or through existing outfalls, or the water could be collected, treated, and hauled off-site. Specific measures to protect water quality will be specified in the project's Temporary Erosion and Sediment Control Plan, Spill Containment and Countermeasures Plan, and Surface Water Pollution Prevention Plan.

### Soil and Hazardous Materials

Soil erosion will be controlled in disturbed areas by implementing BMPs such as those listed above to protect water quality, as well as temporary sediment detention basins and other means. Stockpiles should be covered when not in use to mitigate erosion from surface water and rain.

Contamination will be encountered no matter what alternative is constructed. If that soil contains more than 5 percent wood debris, it would need to be transported to a solid waste landfill that is permitted to accept wood debris, including creosote-treated piles. Soil with a low concentration of contaminants may be disposed of at a land reclamation facility. Soil that is considered a hazardous waste will require appropriate handling and disposal according to the type and concentration of the contaminants. Additional information on hazardous materials handling and disposal options are the same as presented in **Section 9.1.2** of the *2004 Draft EIS Appendix U*. The *2006 Supplemental Draft EIS Appendix U* also includes preliminary cleanup cost estimates in **Section 9.2**.